AMATEUR RADIO

VOL 51, NO 12, DECEMBER 1983

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JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

Merry Christmas to all

ADVANCED ELECTRONIC APPLICATIONS
Computer Patch™ Interface CP-1

Now you can easily convert your personal computer and transceiver into a full function RTTY station with the new CP-1 Computer Patch™ interface by AEA and appropriate AEA software and cabling. The CP-1 is a professional quality RTTY/CW terminal which cuts no corners on sensitivity, selectivity, and reliability. Software packages include split screen operation and large type-ahead and message (brag) buffers at all the common RTTY and CW speeds.

The CP-1 Computer Patch™ is easy for an inexperienced RTTY operator to hook up and operate, but will still appeal to the more experienced and sophisticated RTTY user. The CP-1 is a moderately priced, high performance, feature packed unit, which utilizes reliable innovative design in the style you have come to expect from Advanced Electronic Applications. It is priced competitively with other popular units, but includes many extras not offered by them.

With the tremendous price drop in personal computers, your total system cost is far below that of dedicated RTTY/CW systems which offer few, if any, additional features. No computer programming knowledge is required to use the CP-1 with your computer and you will still have the opportunity to use your personal computer for a variety of unrelated functions.

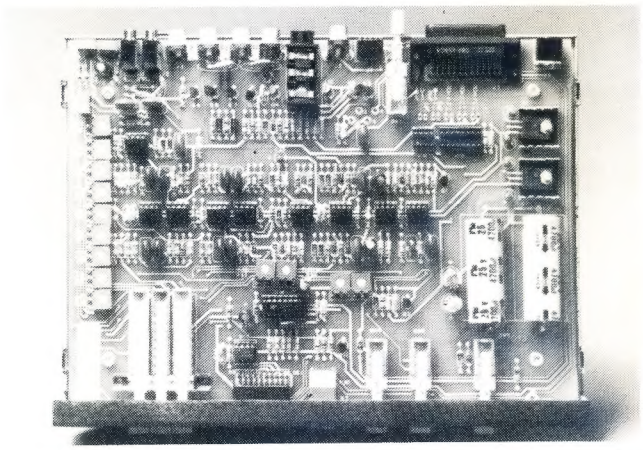
The CP-1 demodulator provides greatly improved performance compared to popular single channel RTTY detectors. An easy to use AEA magic-eye bargraph tuning indicator gives the closest thing to scope tuning, but separate Mark/Space scope output jacks are also provided. A state-of-the-art multi-usage active filter is incorporated offering pre and post limiter filtering. Floating comparator (automatic threshold) circuits give the best possible copy under fading and weak signal conditions.

Additionally, the CP-1 offers a variable receiver shift capability for any shift from 100 to 1000 Hz with a NORMAL/REVERSE tone selector switch on the front panel.

A function generator chip is utilized for clean, stable sine wave AFSK tone output to the

transmitter. Both plus (+) and minus (–) keyed output jacks are provided for CW keying of virtually any popular transceiver. Automatic transmit/receive switching is available under computer control or from a front panel manual transmit button. Output and computer control signals are available in the usual TTL levels (or RS-232 format with an optional low cost RS-232 kit).

Power requirement for the CP-1 is 16 VAC. The CP-1 Computer Patch™ is housed in an attractive all-metal enclosure with extensive R.F. filtering for minimal R.F. susceptibility or radiation, far exceeding Part 15, subpart J, FCC requirements. The CP-1 measures 10" wide x 2¾" x 8¼" deep and weighs approximately 1½ pounds.



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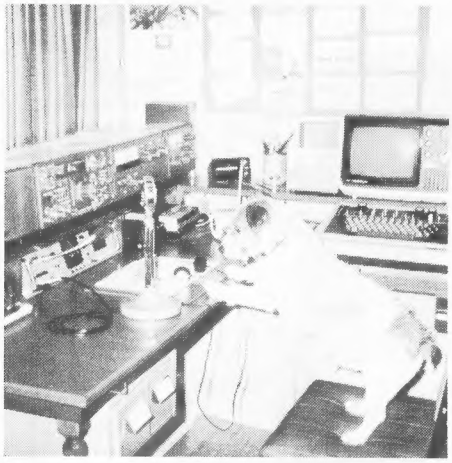

No! It isn't Nipper but Timbo the second op at VK5QV. See article page 13.

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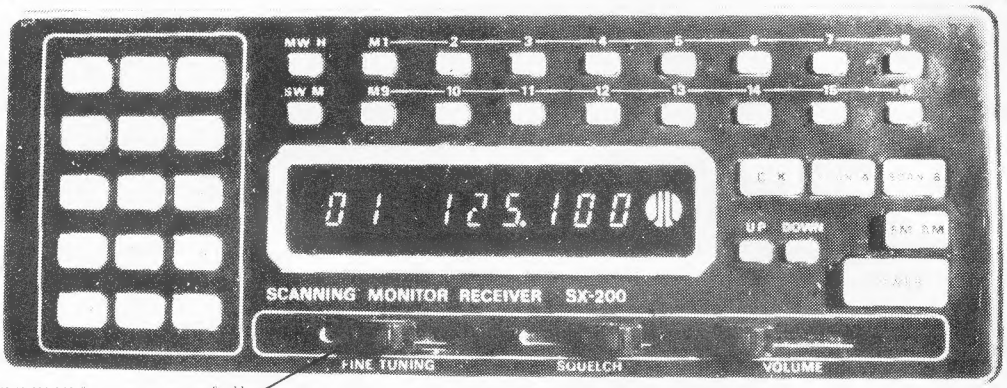

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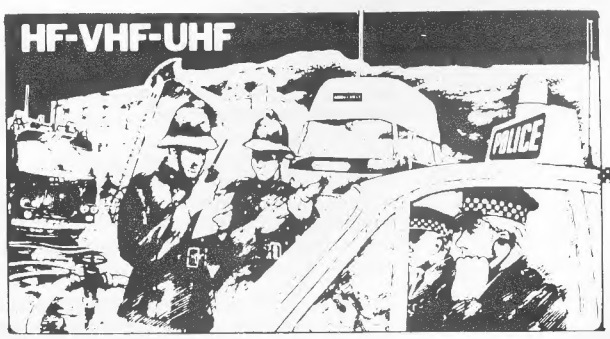

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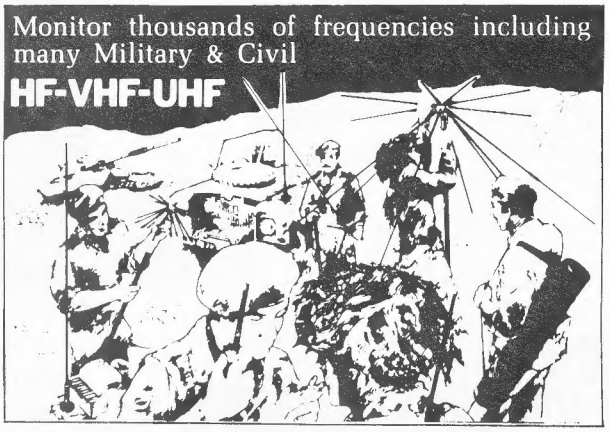

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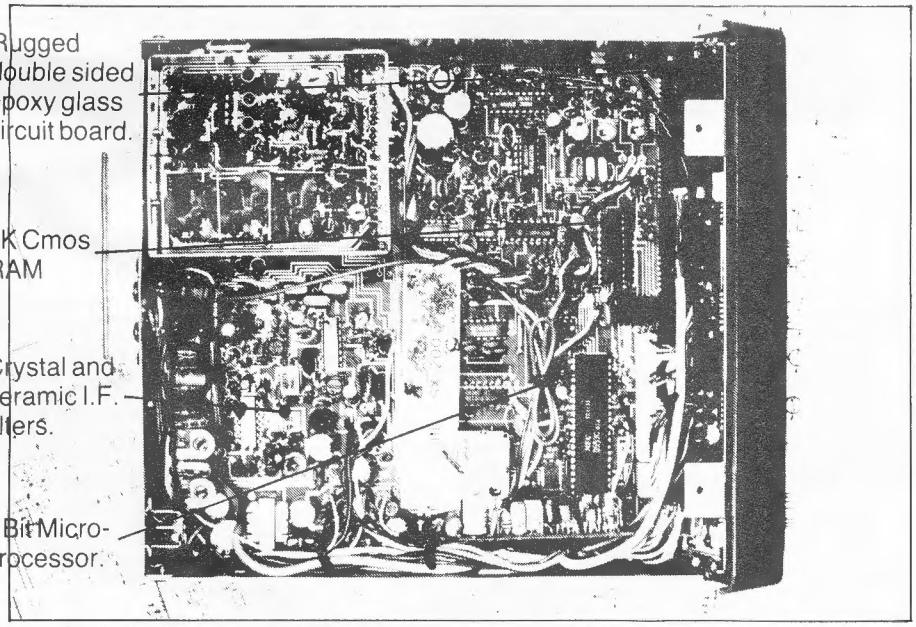

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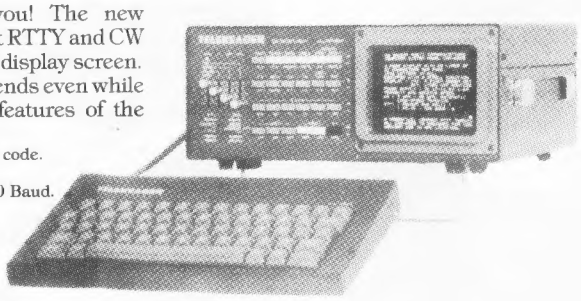

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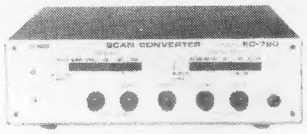

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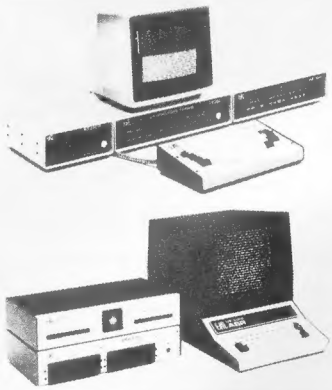

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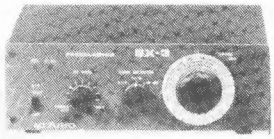

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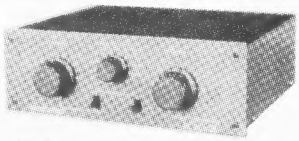

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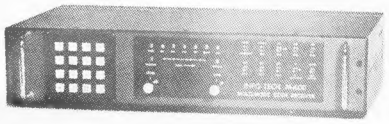

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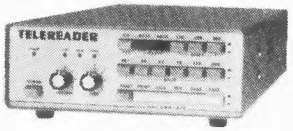

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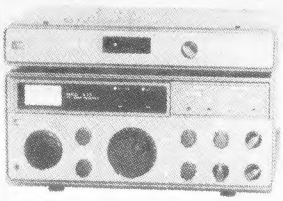

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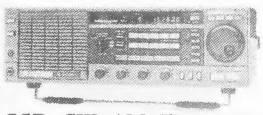

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WELZ DP-BU5/BU7, 1:1, 2kW for beams	$32
SCALAR 4:1, 2kW for beams & dipoles	$49
SCALAR 1:1, 2kW for beams & dipoles	$49
EMTRON EBL 300 4:1, 300W for ant. tuners	$19
EMTRON EBL 1000 4:1, 1000W for ant. tuners	$33
EMTRON EBL 2000 4:1, 2000W for ant. tuners	$44

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TOYO T25, 25W, 200MHz	$19
TOYO T100, 100W, 200MHz	$69
TOYO T200, 200W, 200MHz	$89
WELZ CT15A, 15W, 450MHz	$22
WELZ CT15N, 15W, 450MHz	$29
WELZ CT150, 150W, 450MHz	$85
WELZ CT300, 300W, 250MHz	$110

ANTENNA ROTATORS

KR-250 light duty rotator	$115
KR-400 medium duty rotator	$149
KR-600RC medium duty rotator	$259
KR-2000RC heavy duty rotator	$459
KR-500 elevation rotators	$195
KR-050 stay bearing	$39
8 core rotator cable	$0.95/metre

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SP-600	$199 + $10 Post
SP-300	$185 + $8.50 Post
SP-350	POA
SP-15	$68 + $6.50 Post
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CN-540	$89 + $4 Post
CN-550	$109 + $6 Post
CN-720	$185 + $6 Post

COAXIAL SWITCHES

TOYOSA-450, 2pos, 2kW, 500MHz	$26
WELZ CH-20A, 2pos, 2kW, 900 MHz	$39
WELZ CH-20N, 2pos, 2kW, 1300MHz	$59
DAIWA CS-201, 2pos, 2kW, 500MHz	$29
DAIWA CS-401, 4pos, 2kW, 500MHz	$99

FILTERS

DRAKE TV 3300 LP filter	$45
MONITOR TV: HP30 HP filter	$29

TET HF ANTENNAS

HB-338P 3el, 3 band beam	$325
HP-34D 4el. 3 band beam	$359
HB-35C 5el, 3 band beam	$439
MV-5BH 6 band vertical	$179
MV-3BHR 3 band vertical	$145
TE11F3J 3el, 11m broad band beam	$97
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- DOG BONE TYPE, 70mm long $1.50
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OPEN WIRE TRANSMISSION LINES INSULATED 450 OHM Brown Polyethylene
AWG Size: 18 Conductor: Solid BCW Nom. O.D. 075 x 925

COAXIAL CABLES
50 OHM HEAVY DUTY TYPES RG8/U Low Loss 10D-2V Extra Low Loss UHF RG-58/U Low Power
75 OHM TYPE 7C-2V Heavy Duty Low Loss for Dipoles, Inverted "V" etc. This is not a TV cable.

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The ultimate in HF transceivers.
General coverage receiver.
Amateur band transmitter.

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These are not new world models and are for Australian sales only.

The performance and features are identical to the present model numbers and the only difference is that the out-of-Amateur band transmissions are no longer possible. However the Receiving section is totally unchanged.

All equipment capable of transmitting outside of the Amateur Bands rate a 30% duty and this equipment is not in the spirit of Amateur Radio.

$1100
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TS-43X HF TRANSCEIVER
Complete with MB-430 and MC-42S

PLEASE NOTE

Due to a shipping problem the TR-9500 was not available in November but will be available from mid-December. Also production delays on the AT-230 mean stocks will not be available until after January 1984. All orders placed during the Summer Sizzlers Sale will be honoured at that price for delivery in early February.

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The TS-530SP HF transceiver has all the features of TS-530S but with improvements and the very latest in circuit technology.

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IMPROVED MODEL

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Computer Aided Transceiver

FT 757 GX

Wow! What a transceiver. Everything you could EVER want . . . and then some! Even before its release, Yaesu have over 5000 on back order: that's just from the brochure!

It's the absolute latest state-of-the-art in design - in fact, its CAD/CAM (computer aided design, computer aided manufacture) ensures unbelievable standards of reliability.

LOOK AT THESE FEATURES:

- **All mode – including FM with no optional extras**
- **All HF bands from 160 to 10m including WARC**
- **General Coverage Receive – 500 to 29.999MHz**
- **Computer Aided – use with your micro for external control**
- **Full 100W PEP/DC at 100% duty cycle**
- **Tiny 238 x 93 x 238mm (smaller than some 2m rigs!)**

NOT $1399 AS RUMOURED . . .
NOT EVEN $1199 - ONLY $999.00

STOCKS DUE IN MID TO LATE DECEMBER . . BUT WILL THERE BE ANY LEFT FOR YOU ?

FP 757 GX
SWITCH MODE SUPPLY

Neat! Fits under your FT 757 and you'd hardly notice it was there! Designed just for the FT757, makes your base station really look the part. 240V input.
Cat D-2941

$299.00

FC 757 AT
Antenna Coupler

The very latest auto coupler for your 757. Great for mobile & contest use - you can almost work into a piece of wet string!
Cat D-2942

$399.00

FIF 232 C
RS-232C Interface

Run your transceiver via your micro. Allows external control of VFO, memory functions, etc. 4800 Baud - so it's fast!
Cat D-2943

Due in stock next month!

$99.00

Before buying elsewhere check the Dick Smith **'Invisible Extras'**

- We honour Yaesu's 12 month guarantee: beware of others who may only offer you a 90 day warranty!
- We have the largest service centre to back that guarantee. If anything does go wrong with your Yaesu, we can fix it fastest!
- Dick Smith Electronics: Australia's largest supplier and Yaesu factory approved distributor and service centre.
- Dick Smith Electronics have over 40 stores throughout Australia (with more to come!) plus over 200 approved re-sellers. You're never far from friendly help and service!

All available from most Dick Smith Electronics stores . . .

AMATEURS: CAN YOU MEET THE CHALLENGE?

of a 'Home Brew' UHF Transceiver

Remember the good old days' of amateur radio'? When an amateur built his own gear and was **so** proud of it' Sadly those days passed! With incredible advances in technology, it became economically and technically impossible to compete with commercially built equipment **NOW** home brewing is here again! And what's more with the all new Dick Smith UHF Explorer, you'll end up with a transceiver less than the cost of a commercial unit – and not just as good – **better**! YES! A completely up-to-the-minute design featuring phase locked-loop frequency synthesis

Exclusive to Dick Smith Electronics

Cat K-6300 **$199**

SPECIFICATIONS:

Freq. Cov	438 025 - 439 000MHz in 25kHz steps
No of Channels	40
Mode of Operation	FM
Supply	13.8v DC Receiver 340mA with full audio output and all options Transmitter 2A more (5 watt output)
Receiver	Dual Conversion Superhet
Sensitivity	0.4uV for 20dB quieting
Selectivity	+/–7.5kHz – 6dB +/–15kHz – 60dB
Adj. Chan. Reject	Better than 80dB
Transmitter	
Power Output	5W (typical)
Deviation	+/–5kHz
Spurious Emissions	Better than -60dB

OPTIONS AVAILABLE

Upgrade Kit (Cat K-6302)
(Repeater, S meter, additional xtal filter & new front panel)

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UHF Antenna Kit

Just for your UHF transceiver. Includes deluxe gutter gripper base, UHF co-ax and whip with cutting details. Also suitable for UHF CB.

Cat D-4014 **$24.50**

NEW 70cm Hand-held

YAESU FT-708R

Superb hand-held transceiver for those people constantly on the go! Covers full 438-439MHz band in 25kHz steps, with simplex AND standard 5MHz repeater split.

Look at these features:
● 10 memories ● Low 720g weight ● Switchable 200mW/ 1W output. NiCad battery (and charger!) and rubber duckie whip are included!
Cat D-2930

and it's only
$399

ECONOMY ALL MODE

SAVE $50

Cat D-2900

THAT'S THE DIRECTLY IMPORTED

DICK SMITH SS105S HF TRANSCEIVER

Last chance for a real bargain! All band HF transceiver now reduced to clear – and look at the incredible specs. Where else could you get a transceiver of this type for under $500? And with optional pcb, it will even do FM (great for 10m and for transverting!).
Quick – before they all disappear!

WAS $549 ***AMAZING VALUE ONLY*** **$499**

ACCESSORIES FOR THE SS105S

Noise Blanker
That really works! Minimise most types of pulse noise. Highly recommended for maximum transceiver capability. Cat D-2901 **$29.95**

FM receive IF unit
FM receive circuit to convert 9MHz to 455kHz and amplify and detect signals; equipped with a built-in squelch circuit. Cat D-2902 **$59.95**

FM transmit IF unit
IF circuit for FM transmit, consisting of a modulation circuit & IF amplifier. Cat D-2903 **$34.95**

25 kHz monitor
Plug-in pcb to give 25kHz for accurate calibration. Cat D-2904 **$34.95**

100W Linear Amp
100W Linear Amplifier. For when you've got that big ticket! Work the world – and more (more?) Cat D-2905 **$249**

Build your own Phone Patch

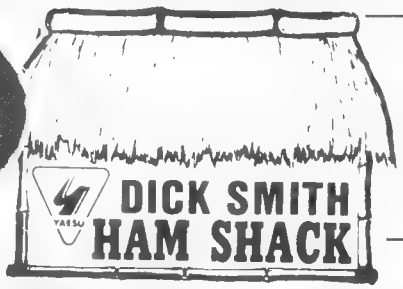
Phone patching is legal from November 1st! Build your own phone patch and save a fortune . . . very simple kit, suits most transceivers. Compare our price from built-up units!

Cat K-3054 **$59.50**

Not Telecom Permitted

HFC

WHY NOT USE HFC FINANCE - It's so easy to balance your Xmas budget! No repayments until March 1984 (Approved applicants only)



Dick Smith Ham Shacks are located in the Dick Smith Stores listed below. You'll find a licensed amateur at each Shack.

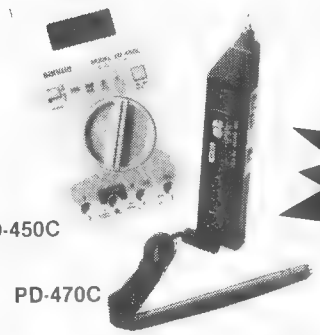
● **Sydney** 125 York St 267 9111 ● **Sydney** 6 Bridge St 27 5051 ● **Gore Hill** 162 Pacific Hwy 439 5311 ● **North Ryde** Lane Cove & Waterloo Rds 88 3855 ● **Gosford** 315 Mann St 25 0235 ● **Melbourne** 399 Lonsdale St 67 9834 ● **Richmond** Bridge Rd 428 1614 ● **Springvale** Springvale & Dandenong Rds 547 0522 ● **Brisbane: Buranda** 166 Logan Rd 391 6233 ● **Townsville** Ingham Rd & Cowley St West End 72 5722 ● **Toowoomba** Bowen & Ruthven Sts 38 4300 ● **Adelaide** Wright & Market Sts 212 1962 ● **Perth** William St & Robinson Ave 328 6944 ● **Cannington** Wharf St & Albany Hwy 451 8666 ● **Hobart** 25 Barrack St 31 0800 ●

bankcard welcome here

DICK SMITH Electronics

All items normally in stock at the 'ham shacks' listed above – other Dick Smith stores may order them for you

One name takes all the confusion out of selecting a multimeter.



TWO NEW DIGITAL MULTIMETERS NOW AVAILABLE

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BIG RANGE OF IMPORTED FRAMES — VERY QUICK SERVICE — DISCOUNT FOR ANY AMATEUR OR SWL AND A CAMERA STORE TOO AT COMPETITIVE PRICES AT YOUR DISPOSITION

SEE YOU SOON

VK2BPO

BUTTERNUT ELECTRONICS CO.

Still More Usable Antenna For Your Money . . .
Plus 30 Metres!

Butternut's new model HF6V* offers more active radiator on more bands than any other vertical of comparable height DIFFERENTIAL REACTANCE TUNING ™ circuitry lets the 26' antenna work on 80/75, 40, 30, 20 and 10 metres and a loss-free linear decoupler gives full quarter wave unloaded performance on 15 metres It can also be modified for remaining WARC bands.

- ★ Completely automatic bandswitching 80 through 10 metres including 30 metres (10 1-10 15 MHz) 160 through 10 metres with optional TBR-160 unit
- ★ Retrofit capability for 18 and 24 MHz bands
- ★ No lossy traps to rob you of power The HF6V's three resonator circuits use rugged HV ceramic capacitators and large-diameter self-supporting inductors for unmatched circuit Q and efficiency
- ★ Eye-level adjustment for precise resonance in any segment of 80/75 metres, incl MARS and CAP ranges No need to lower antenna to QSY between phone and CW bands
- ★ For ground, rooftop, tower installations no guys required

Model HF6V (automatic bandswitching 80-10 meters) **$282**
Model TBR 160 (160 metre base resonator)
(When supplied as part of HF6V) **$66**

For complete information concerning the HF6V, TBR160 bulletin [illegible] the sole Australian agent

TRAEGER DISTRIBUTORS (NSW) PTY LTD
PO Box 348, Moree, NSW. 2400.
Cnr Adelaide & Chester Sts.
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★ Patented device

THE WOODPECKER BLANKER

Now sold by mail order to New Zealand, West Germany, Great Britain the Netherlands, Sweden and the U.S.A. (US Patent Pending)

- Available as a kit or fully assembled and tested
- Kit includes fibreglass PCB all components including IC sockets, drilled cabinet and full instructions

A REAL BARGAIN at $49 kit and $75 fully assembled and tested (Plus $6.50 post and handling)
— the price has not increased in 18 months — but be warned — 20% price rise expected from December 15.

- Can be used as both an IF stage blanker and an audio stage blanker.
  — as an audio blanker, can be plugged into any receiver or transceiver with no soldering or tinkering required.
  — as an IF stage blanker connects into most existing transceiver noise blankers

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On behalf of our advertisers

WE WISH YOU

SEASON'S GREETINGS

a word from your EDITOR

EDITORIAL

The festive season is upon us. Holidays and the Christmas and New Year Festivities are now on everyone's mind.

Many will be thinking of new equipment. Others will be planning portable and mobile operation. Our advertisers have something to suit. Remember to tell them that you saw it in Amateur Radio.

When undertaking mobile and portable operation give a thought for safety. Look up and watch out for power lines when rigging temporary aerials.

Have your extension leads checked. Treat unknown power points with caution. Simple checks may save your life. Some holiday power sources may not be as safe as we have come to expect. A modicum of care and simple checks will keep your holiday happy.

Make this holiday a safe one.

Whilst relaxing and recovering from a hectic 1983 why not write up your premier project. Amateur Radio is always looking for good articles. So take the time and write for your magazine.

I would like to thank the Publications Committee, contributing editors and all contributors for their support during the year. Special thanks also to the staff of the Federal Office and to Betken Productions for all the effort they have put into the production of the magazine.

Last but not least I would like to wish every reader the compliments of the season.

AR

WIA NEWS

PHONE PATCHING

The Institute is not happy with the policy currently issued and will be negotiating the details with Telecom.

Below is a precis of the relevant sections.

2 *CATEGORIES PERMITTED TO INTER-CONNECT*

2.1 *Radio amateurs operating a fixed or mobile service.*

4 *AUTHORITY TO CONNECT*

4.1 *For all situations an application for authority to connect will be necessary and would be valid for twelve months.*

4.2 *When applying for authority, all categories are required to submit documentary evidence of inclusion in para 2.1 above.*

5 *RESALE*

5.1 *Service that interconnection provides may not be sold, leased or rented.*

7 *RADIO LICENCE*

7.1 *The radio service to be interconnected and where appropriate must have a licence.*

8 *CHARGES*

i Call Charges
Natural call rates will be charged.

ii Access Charges
Non business telephone service — $2 per month (per connect point between the radio service and the switched telephone network).

9 *CONNECTION*
The connection of radio equipment as defined will only be permitted via a Telecom provided socket installed exclusively for the purpose. Standard charges will be applied for installation of the socket.

10 *TECHNICAL REQUIREMENTS*
Equipment used to provide the inter-connect facility must meet the technical requirements of Telecom specifications 1053, 1439, 1302, 1222 and any other specifications that may be produced specifically for this purpose. Details of the equipment will need to be submitted to Telecom for evaluation and a permit for its use issued before it can be considered for use of an authority to connect. Standard charges for evaluation of equipment will apply.

These conditions replace all previous and take effect from 29/9/83.

Naturally, Phone Patch can only be conducted between countries with which Australia has Third Party agreements and Phone Patch facilities.

LORD HOWE ISLAND

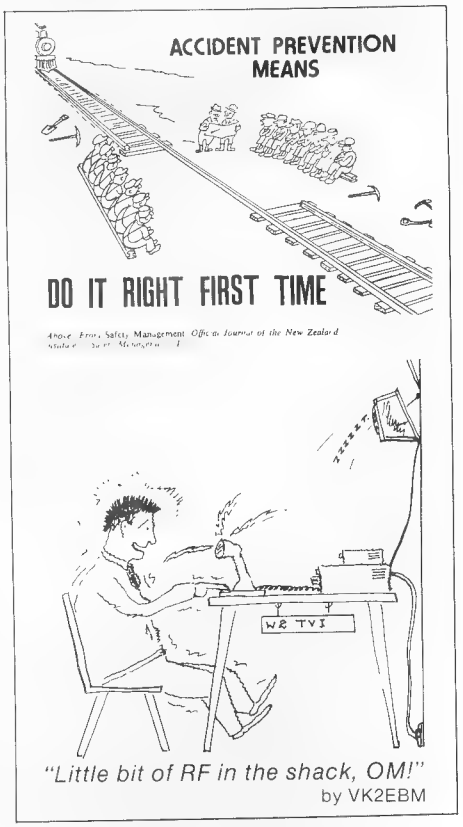
Following representations from the amateur community to DOC, approval has been given for the callsign VK2LHI to be employed by amateur radio clubs or amateur groups engaging in "DX" competitions, for specified limited periods, from Lord Howe Island.

Approval has been given to the Down Under DXers Club to use the callsign VK2LHI during the CQ World Wide DX Contest taking place between 23rd October 1983 and 3rd November 1983. Club station rules apply for the duration of the contest.

CONVENTION 1984

By the time members read this issue and have recovered from the Christmas holidays, the next WIA Convention will only be four months away.

Now is the time to bring to the attention of your Division Councils items that you feel need to be discussed at the convention.



"Little bit of RF in the shack, OM!"
by VK2EBM

PRESIDENTIAL COMMENT

TRADITIONAL CHRISTMAS?

It's that time of the year again, some say "The Silly Season". Children in particular look forward to it. We parents still have vivid memories of last years' Christmas celebrations.

It seems the older we get, the quicker each year seems to pass something traditional?? One could say that is the price we pay for progress.

Talking of progress, let me reflect on some of the current doings within the Federal Body of the WIA. There are several items on our plate, but two of these require an early "airing" to advise members of our position, while most of you are relaxing and enjoying the holiday festivities, several of your volunteer representatives will be working extremely hard.

Two important items are:

1. *Proposals by Queensland yachtspeople trying to get their foot into the top 50 kHz of the 20 metre band for marine use exclusively.*
2. *Consistent advertising of general coverage transmitting amateur equipment, by an established NSW amateur retailer, and directed towards mariners.*

In both of the above, we are being hampered by articles published in yachting magazines, which condone the use of converted amateur equipment on marine and other commercial frequencies.

This type of activity is not only unethical, it is also illegal to use amateur equipment on marine frequencies.

In my opinion, both of the above items are simply — "not on".

We must be very careful that the power of the "mighty dollar" does not edge its' way into the amateur service again.

These continued threats do not enhance relations between the amateur and yachting fraternities. Our complaints are falling on deaf ears, therefore, WE must now be prepared to take action to protect our interests:

(A) Closely monitor marine traffic in the amateur bands, particularly 20 metres, (14.313 MHz), then,

(B) Take special note of the joint WIA/NZART statement published in the August issues of AR and Break-In (NZ), and other magazines.

(C) Give consideration to a complete shut down of maritime mobile "traffic nets", except in cases of emergency. (Are they serving any useful "Amateur" purpose??)

(D) Consider a boycott on the retailer(s) who has lined his pockets at our expense, by openly advertising and selling converted amateur transmitting equipment to the yachting fraternity.

This action alone has been the cause of much frustration, and one of the main reasons for the imposition of the 30% tariff duty.

Make it known to the retailer the reason for the boycott.

The new radio-communications act will assist here, if and when it is finally passed by the Senate. In the meantime, and prior to new regulations being formulated, much harm is being done to the Amateur Service by these parasites.

We therefore must look after our own interests first.

DON'T FORGET:

Subscriptions for 1984 are now due, please renew promptly to ensure proper continuity.

A SPECIAL CHRISTMAS NOTE:

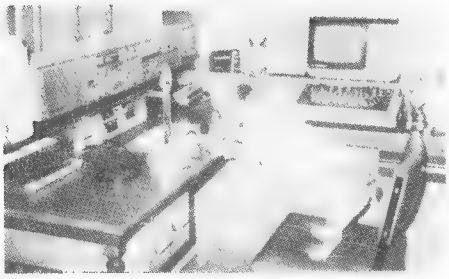
Alcohol and cars don't mix - TAKE A TAXI INSTEAD – WE need you TOO!!

A joyous and safe Christmas from Bruce Bathols, VK3UV on behalf of the *WIA Executive.*

AR

STATION CONTROL PANEL — Not A Weekend Project

Ivan Huser, VK5QV
7 Bond Street, Mount Gambier, SA 5290



In this the fourth and final article, I would like to present some ideas for a station control panel and extend the discussion to include some notes on the shack layout.

My interest in station control panels goes back to an early fascination for the control console associated with broadcasting stations. The panel currently being used at VK5QV is the fifth in a line of such panels which have been constructed over the years and is by far the most complex. This is due in part to the advances made in solid-state electronics and the practicability of packing a lot of electronics into a comparatively small space.

The front of the panel is a standard 19 inch (483 mm) rack and panel width, is 4¾ inches (120 mm) high and slopes back from the vertical by about 20°. The panel is positioned centrally under the shelf supporting the HF equipment — see cover photo.

The electronics associated with the control panel is completely shielded in a metal enclosure behind the panel proper. The rear apron of the enclosure is used for the entry and exit of cables.

Mounted on the apron are two double general-purpose-outlets, a fuse, a key-switch and several sockets. As well as the 240 V, two 12 V regulated supplies and a 9 V regulated supply are brought out. Due to lack of space, most of the connections are made using fly-leads through grommeted holes. Shielded compartments are used to isolate the power and audio sections from the rest of the circuitry.

CONTROLS

Figure 1 shows the placement of controls on the front of the panel.

1 *Microphone equaliser.[1] The three knobs on the left, control the equalisation of the panel mounted microphone. The fourth knob is a slide switch used to select the appropriate input to the transceiver — microphone 1, microphone 2, tape recorder, two-tone test signal etc.*
2 *Microphone 1. This is a panel mounted electret microphone permanently connected to the graphic equaliser.*
3 *Microphone 2. This socket is for the connection of an alternative station microphone. The transceiver push-to-talk connections are also brought out to this socket.*
4 *Two-tone oscillator.[2] Frequency, balance and gain controls are brought out.*
5 *Headphone sockets. These sockets are connected so that standard stereo phones can be used. One socket is attenuated such that there is a balance between speaker and headphone volume.*
6 *Digital inside/outside thermometer.[3]*
7 *Speaker switch. This connects the*

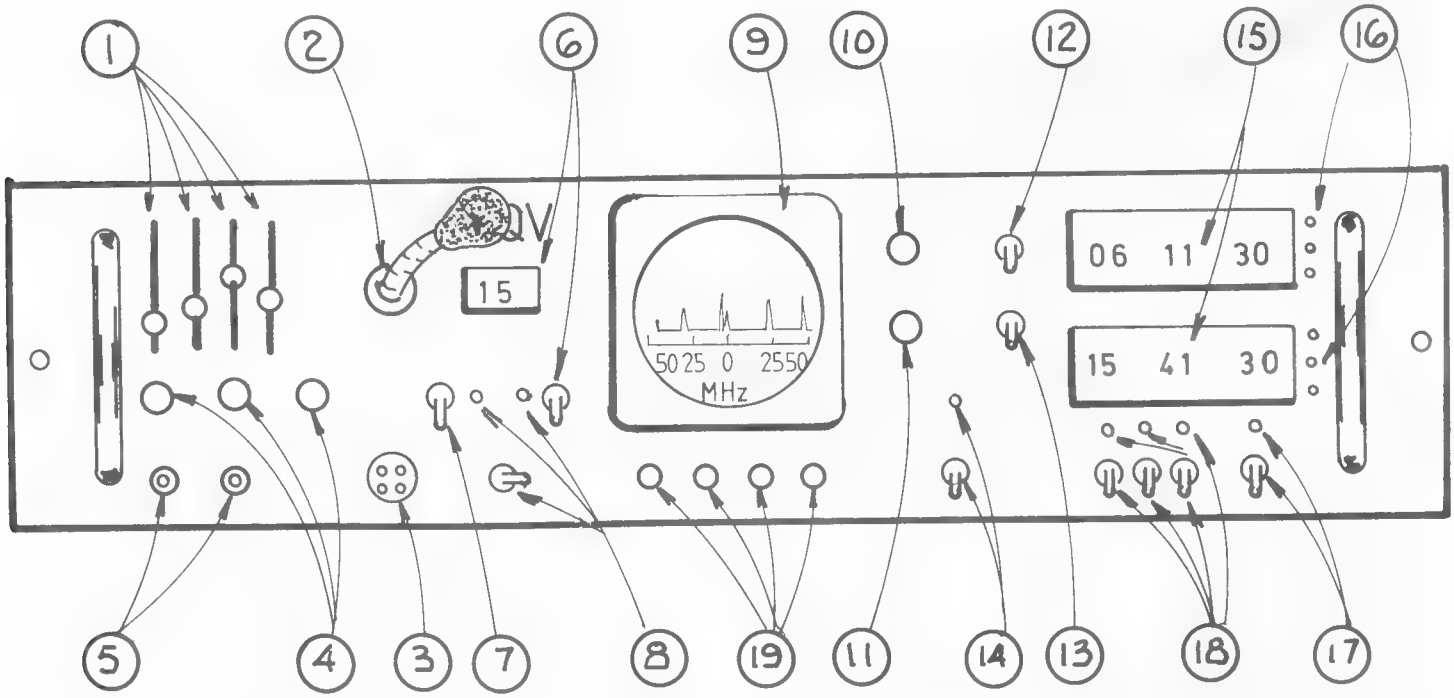


Fig 1 — Panel Layout.

external speaker in parallel with the headphone sockets.

8 *Beam rotator control. A 'centre-off' type toggle switch is used to control a prop-pitch motor via solid state relays. Two light emitting diodes indicate the direction of rotation of the beam. Beam heading is shown on a great circle map located above the equipment.*

9 *Station monitor. This is a copy of commercial 75 mm cathode ray oscilloscope. On receive, it operates as a panoramic monitor using a panoramic adaptor.[4] On transmit, it operates as a RF monitor via a capacitive RF attenuator. The time-base has two settings which are automatically selected when going from transmit to receive.*

10 *RF attenuator. See figure 2 for details.*

11 *Display centering. This control centres the panoramic display.*

12 *Tape recorder switch. This allows the tape recorder to be switched between two sources.*

13 *Key select. Either the manual key or the CW keyboard may be selected by this switch.*

14 *Push-to-talk. Moving this switch upwards places the transceiver in the transmit mode. The relay in the transceiver is used to switch on the linear amplifier, a flashing LED above the PTT switch and at the same time select the appropriate time-base rate for the monitor.*

15 *Clocks. Two six-digit clocks showing UTC and local time respectively operate from a single crystal. A battery back-up system maintains correct time during power failures.*

16 *Time setting buttons.*

17 *Main power switch.*

18 *Auxiliary power switches.*

19 *Tape indexing. Although not yet operational, these push-buttons will enable a particular message stored on an endless cassette to be indexed ready for playing. This should be useful for RTTY 'brag' tapes.*

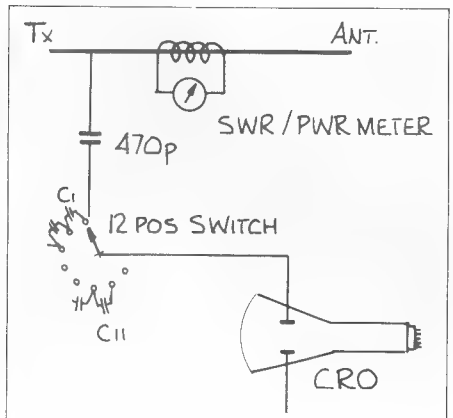


Fig 2 — RF Attenuator.

CONSTRUCTION

Although this is by no means meant to be a constructional article, some reference to the problems encountered may be of interest to anyone contemplating such a project.

One major problem associated with such a project of course is the metal-work. Even if one has access to metal-working facilities, the marking out, drilling, filing etc is quite a tedious process.

After the metal-work is completed use a good automotive undercoat before spraying the final colour. I used automotive touch-up lacquer available in spray cans. This produces an excellent finish although rather expensive. My panel is finished in 'Chrysler Mercury Silver' with black rub-on lettering. Plain chrome cabinet handles were fitted to add a professional touch and to allow the unit to be withdrawn from its normal position.

'BUGS'

The two main problems encountered with the control system were earth-loops and RF feedback.

Generally speaking, the problem of earth-loops was the easiest to solve. It was simply a matter of earthing the leads between the control panel and the transceiver at one point only — at the transceiver. This means that such things as the headphone sockets and microphones must be insulated from the panel. It may also be necessary to by-pass these floating leads for RF at the point of entry (or exit) to the control panel.

To reduce the possibility of RF feedback, the power flex into the unit should be filtered by passing all three conductors through a ferrite toroid three or four times and then by-passing the individual leads with suitable capacitors. The panel itself should be connected to the station ground via as short a lead as possible.

If RF feedback persists, then the normal procedures for detecting the point of entry of the RF should be adopted and a satisfactory solution effected.

SHACK LAYOUT

The acquisition of a station control panel allows most of the cables associated with the installation to be routed behind the equipment thus providing an open, tidy, functional operating area.

Also with the equipment raised above the table top, dials and meters are more easily read, and at the same time storage space for the typewriter, paper or whatever is made available.

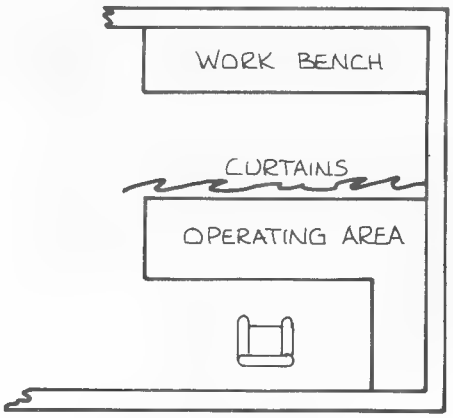


Fig 3 — Shack Layout.

Irrespective of how a station is organised, some leads must inevitably be connected to the rear of the equipment making access to them somewhat difficult. This problem may be solved by making the operating table an island.

Figure 3 shows the basic layout of the operating area at VK5QV Having the work-bench close to the equipment makes maintenance much easier since all inter-connections are close at hand. A curtain attached to nylon runners separates the 'shack' from the 'workshop'.

FINALE

This series of articles was written in an attempt to show how the writer went about setting up a shack and perhaps to stimulate some ideas among readers. In no way am I saying that 'this is the only way'. For instance, the layout of a shack and the equipment in a shack is an individual thing and to some extent may well be dictated by the amount of real estate assigned by the XYL as 'for amateur radio purposes only'.

NOTES

1 MICROPHONE EQUALISER - A Weekend Project — Amateur Radio November, 1983.

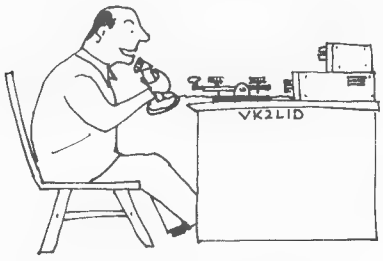
2 TWO-TONE OSCILLATOR — ETI July, 1980

3 DIGITAL INSIDE/OUTSIDE THERMOMETER — A Weekend Project — Amateur Radio October, 1983.

4 PANORAMIC ADAPTOR - A Weekend Project — Amateur Radio October, 1983

"I don't do anything much! He calls CQ and answers all the questions."

from 73 Magazine Jan '83



"Verticals?? I had a vertical that was so bad it wouldn't even receive QRM."

by VK2EBM

Ron Fisher VK3OM
3 Fairview Avenue, Glen Waverley, Vic. 3150

EQUIPMENT REVIEW

THE KENWOOD R-2000 GENERAL COVERAGE RECEIVER

Having been a happy owner of an R-1000 now for some years I was most interested to see just what the new R-2000 had to offer. I was not disappointed, it has a lot to offer.

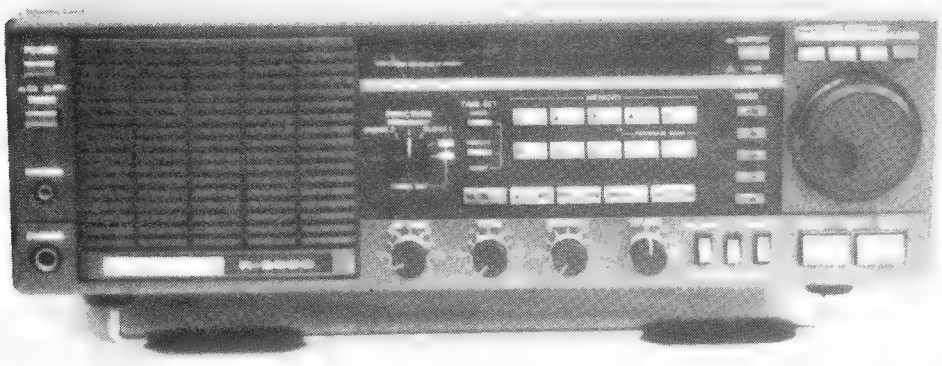
No doubt many present owners of the R-1000 will be considering an update to the 2000 so I am sure that a few comparative comments might be of interest. However lets go back one step before this and look at the evolution of the current model. I am sure many readers will recall the TRIO receivers of the early 1960s. They were single conversion four band valve sets with some-what mediocre performance. I well recall the reams of modifications that were published in AR and other magazines around that time to cure frequency drift and provide better sensitivity, mostly to little avail. In spite of this, many hundreds of these receivers must have been sold and a few still seem to pop up on the second-hand market from time to time. These were followed by a couple of similar design but with transistors instead of valves. In those days this was a mixed blessing. Sensitivity and drift characteristics were better but often cross modulation was almost intolerable.

The R-1000 arrived on the scene in 1979 and at last we had a receiver with all required facilities and a completely professional performance. Many thousands of these receivers must be in current use in both amateur and SWL shacks as well as many professional locations. A couple of years ago, Kenwood released the R-600 which was basically an economy version of the R-1000.

The R-2000 is somewhat larger but the same weight as the 1000. The main difference is in increased width, up by 75 mm. The increased width allows for a good size front facing speaker. The somewhat controversial carry handle come tilt bale of the 1000 has been replaced with a conventional tilt bale and a side mounted carry handle.

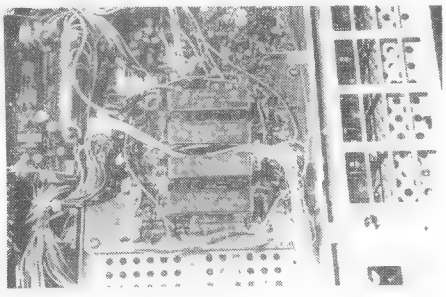
Basic specifications remain the same with full coverage from 150 kHz to 30 MHz with reception facilities for SSB, CW and AM plus the added FM mode. But from here on things change somewhat. Band changing is now fully electronic. Band up/down buttons allow for moving in 1 MHz steps either singly or by holding the button down in rapid sequential steps. Ten memories with memory scan or programmed band scan are available with digital readout to indicate memory selection. The digital frequency readout now reads to 100 Hz and also doubles as a clock which can be set for two time zones with a 24 hour readout. Three speed tuning in 50, 500 Hz and 5 kHz steps make for easy tuning across the bands.

Without doubt the Kenwood design engineers have closely followed the electronic design of the TS-430S transceiver. Even the appearance has quite a family resemblance.



THE R-2000 TECHNICAL FEATURES

As is unfortunately typical these days, no circuit description or details are covered by the instruction manual. However a block diagram is included and a few details from this will be of interest. Six band pass filters are fed from the antenna input via a 10 dB per step front end attenuator. The band pass filters cover two to one frequency ranges with the exception of the low band which covers from 150 kHz to 1 MHz. The RF stage is single dual gate FET followed by a buffer stage into a balanced mixer the first IF of 45.9 MHz. Second conversion is to 9.9 MHz and the third to 455 kHz. Balanced mixers are used throughout. Provision is made for four filters of which three are supplied, a 2.7 kHz for SSB, a 6 kHz for AM and a 15 kHz for FM. The option is a 500 Hz CW filter. Three detectors are switched for SSB/CW, AM or FM. The frequency selection, memory and scanning modes are controlled by the CPU which is powered by a lithium battery when the primary supply either AC or optional DC is removed. This battery has an estimated life of five years.



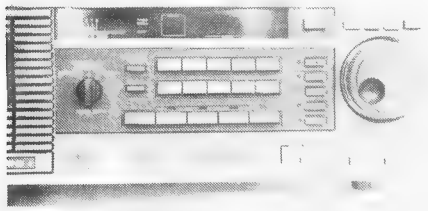
The Filter Section.

THE R-2000 IN USE.

On initial switch on the 2000 really looks superb. The digital readout is bright and clear enough to read right across the room. The selected memory channel is identified with a bright yellow readout to the left of the frequency readout. A nice feature noted when the receiver was set on my desk where the rubber buffers on the tilt bale, no possibility of scratching my desk this time. Firstly the two clocks were set, one on UTC, the other on local. The clock

also has a timer function that allows the receiver to be automatically switched on at any pre set time along with a tape recorder if required. It was noted that the SSB BFO frequencies were well out of adjustment as received with LSB signals sounding very high pitched. USB was acceptable but perhaps a little the other way — a bit bassy. Naturally the instruction book contains no information on correcting this, so it was left as was.

The ten memories were programmed for our favourite operating frequencies and a few short wave broadcast channels. As received from the distributor, our R-2000 did not operate below 2 MHz. The instruction manual refers to this as an 'X' model. A note included from Kenwood says that the receiver is capable of receiving 150 kHz to 30 MHz by cutting D59 on the printed circuit board behind the function switch. I was unable to locate D59 during a quick search of the main printed circuit board. During the setting up process, I was rather disappointed to see that Kenwood have done away with the recessed, upward facing rear panel which was quite an innovation on the R-1000.



Close-up of Switches.

The tuning system is now fully electronic with three push button selected rates. These are 50 Hz, 500 Hz and 5 kHz steps which give an actual tuning rate of 10, 100 kHz and 1 MHz per knob revolution. These speeds also apply when band scanning is in progress. I feel that Kenwood have not chosen these speeds as well as they might. They are all too fast. I feel that 10, 100 Hz and 1 kHz would have been a better choice. The 1 MHz per tuning knob revolution is after all taken care of with the up/down button. However I must admit that tuning SSB signals is a very simple process, but the next step up, I found a little too fast for AM stations. I wonder if there is a simple modification to change this.

Perhaps the best thing on the R-2000 is the memory system. It is, in fact, almost identical to the TS-430 transceiver. The ten memories are programmed with both frequency and mode. So you can have an USB channel on 20, a LSB memory on say 40 and 80 plus a few AM broadcast stations. It is then possible to select any one by a push of the appropriate memory button or to scan around them sequentially. The system will pause long enough at each memory so that the operator can decide if a stop is required. If so, a push of the hold button will stop the scanning sequence.

The programmed band scan using memories nine and ten can be used to tune automatically between any frequencies entered in them. The scan speed is selected by the tuning rate buttons.

AM reception with the R-2000 is excellent. Kenwood have dropped the wide selectivity position of the R-1000 and now provide selection betweeen 6 kHz at the -6 dB points or the SSB filter of 2.7 kHz. The narrow/wide button that allows this selection also selects the narrow CW filter or SSB selectivity when the CW mode is in use. Unfortunately during the course of our tests, I was unable to hear any FM transmissions on 10 metres, but a socket at the rear of the 2000 is labelled VHF converter, so maybe Kenwood have something in mind here. Time will no doubt tell.

The squelch control is useable on all modes and works quite well if you happen to like squelch on HF. With fading signals I can never pick the right level to set the control.

My comments on the TS-430S 'S' meter equally apply to the R-2000. It looks great until you try to use it, then you cannot see it. The noise blanker is both good and not so good. Not so good on the Woodpecker, in fact no effect at all, but quite good on ignition and general electrical hash. The 'Record' output has a constant level output, unaffected by the AF gain. A great idea, but why only on receivers. How about one on transceive.

THE R-2000 ON TEST

The following test equipment was used to produce these figures. Daven audio power output meter. AWA F242A noise and distortion meter. A 100 kHz crystal calibrator with multi vibrator output. Sensitivity tests are subjective and are checked by comparative tests with other equipment.

Audio output was taken from the external speaker socket into the power meter terminated in 8 ohms. The crystal calibrator was fed into the antenna input and the tuning set to produce a 1000 Hz tone. Audio output checks were based on this. Maximum power output was 3 watts but with very high distortion. At 2 watts distortion was 3.2% and at 1.5 watts 1.9%. With the audio gain control set at zero, system noise was -65 dBm, a very acceptable figure.

The tone control was checked in the fully on position. At 2.5 kHz the response was down 12 dB. At 2 kHz -9 dB, 1.5 kHz -7 dB, 1.0 kHz -4.5 dB and at 700 Hz -3 dB. This is quite acceptable performance and was useful lopping off some of the excess highs in the LSB position. AGC action was checked by listening to a variety of strong and weak signals. There was no pumping or popping on strong signals and in general SSB reception sounded very smooth. AGC decay is selectable for slow or fast with a front panel switch, but is not automatically selected with a change of mode. Next the crystal calibrator was fed into the antenna input to give an 'S' meter reading of S1. The audio output level was checked and then the RF input was increased to give a reading of S9+30 dB. The audio output increased by 2 dB. This was a quite reasonable figure.

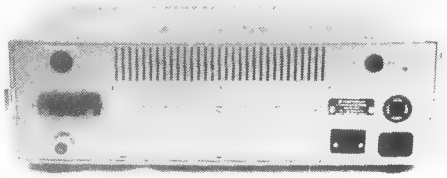
The response of the SSB filter was checked by feeding a weak signal (below the AGC threshold) into the front end and measuring the audio output level while tuning across the signal. The USB setting was used as this appeared to be reasonably normal compared to the very off frequency LSB. The -6 dB points were 400 Hz and 2.8 kHz with 3 kHz -12 dB. Overall SSB selectivity appeared to be fairly good but perhaps a little wide at the -60 dB points. The R-2000 has no IF shift or band pass tuning to help separate wanted signals from interference.

The optional CW filter was not fitted to our review receiver. From 2 MHz up the performance of the R-2000 was very acceptable. The stability was excellent with little shift over a half hour period from a cold switch on. Pity I was unable to check the low frequency performance. This is where many current receivers fall down badly. While looking around for the elusive D59, I noted that it is possible to have either open scan or scanning that will stop on signal. To arrange this, a jumper is changed on the circuit boad accessible with the bottom cover removed. Further details are on page 11 of the instruction manual.

INSTRUCTION MANUAL

The R-2000 instruction manual is completely disappointing. It is a four language thing with English as the first part. So far as operating procedure and installation goes, it is quite good. Various types of antennas are discussed in relation to their use with the R-2000. However apart from a block diagram and circuit diagram, there is no technical information at all. A short section on short wave propagation is interesting.

The last page discusses the options available for the receiver. These are two different headphones, a CW filter and the very excellent Kenwood World Clock. Installation instructions are provided for the CW filter.



Rear View.

CONCLUSIONS

The R-2000 receiver is, without doubt, a very advanced piece of equipment. Not only that, but the overall performance is very good in most wanted respects. Some might consider the appearance to be a bit over styled and the S meter is certainly not up to the overall standard of design. The R-2000 will however put Kenwood right out front in the popular general coverage receiver market for some time to come.

Our review model was supplied by KENWOOD AUSTRALIA and all enquiries regarding the R-2000 should be directed to them or one of their local agents.

AR

A Review of the C8900E coming next month.

EVALUATION AND ON AIR TEST OF THE R-2000 RECEIVER

Serial No 3070643

Category	Rating	Comments
Packaging	***	*Double carton with foam inserts.*
Size	**	*Larger than preceding model.*
Weight	***	*Same as preceding model.*
External finish	***	*Well finished but slightly over styled.*
Construction quality	***	*Good quality boards and internal wiring.*
FRONT PANEL		
Location of controls	***	*No concentric controls. All well laid out.*
Size of knobs	***	*All very good.*
Labelling	***	*Clear labelling.*
Meter	*	*Very over styled. Hard to read.*
VFO knob action	**	*Very smooth, but tuning rates not ideal.*
Dial readout		
Analogue	*NA*	
Digital	***	*Bright and easy to read. Accurate resolution to 100 Hz.*
Status indicators	****	*One of the best yet.*
REAR PANEL	**	*Not nearly as good as the R-1000.*
RECEIVER OPERATION		
VFO stability	****	*Hard to fault, see test section.*
Digital dial accuracy	****	*Spot on.*
Memories	****	*Recalls both frequency and mode. Best yet seen.*
Shift/width	*NA*	*No shift or width controls provided.*
Notch filter	*NA*	*No notch filter.*
Spurious responses		
S meter	***	*Realistic response. Smooth action.*
AGC performance	***	*Very adequate AGC performance.*
Signal handling	***	*No problems with strong signals.*
RF attenuator	***	*10 dB steps. Better chosen than R-1000.*
RF gain	*NA*	*No RF gain control.*
Sensitivity	***	*On subjective test, very good.*
Selectivity	***	*Good choice offered — adequate selectivity for most purposes.*
NOISE BLANKER		
Woodpecker	*	*No effect on Woodpecker.*
Electrical & ignition noise	***	*Worked well on this type of noise.*
QUALITY OF RECEIVED SIGNAL		
Internal speaker	**	*Front facing speaker. Satisfactory quality.*
External speaker	*NA*	*No optional speaker offered.*
Headphone output	***	*Stereo compatable. Output level good.*
Tone control	***	*Very useful top cut.*
MANUAL (owner's handbook)	**	*Satisfactory as operator manual. No technical information.*

Rating Code: Poor * Satisfactory ** Very Good *** Excellent ****

WHO IS THIS AMATEUR?

He first obtained his licence on 18th September 1936 and immediately began operating from 90 Prince Street, Thompson Estate, Brisbane. In the space of twelve months he had made over 1000 contacts on CW, including DXCC — something few OT amateurs accomplished in their first year of operation. The all-homebrew station was extremely neat and efficient, with the transmitter using a pair of 45s in parallel in the final stage to a half watt vertical on 20 metres and the receiver a three tube TRF.

A WIA Queensland member since pre-war days, he served on executive on more than one occasion, being QSL Officer twice (a duty he discharged with considerable efficiency) and Morse code instructor when the meetings were held in the Celtic Chambers.

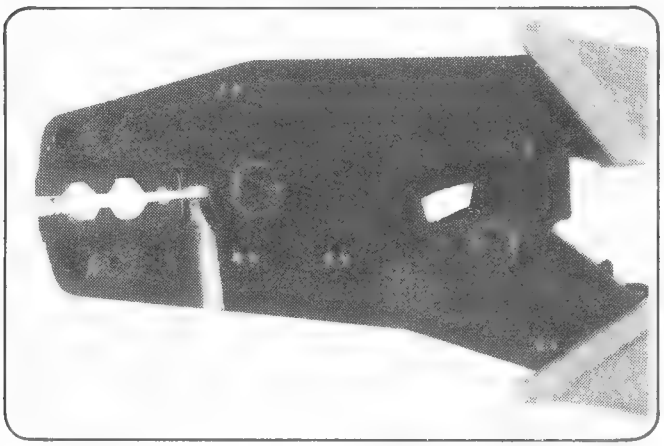
During WWII he served as a W/O in the Navy for the full five years of its duration, then commenced working with the PMG as a technician and moved to Dalby. He later returned to Camp Hill, Brisbane and spent a considerable time at the Frequency Measuring Station at Capalaba until his retirement in 1979. As a 'DXer par excellence' and a member of FOC and RSGB he became known as 'Brisbane's Mr DX', having over 300 countries confirmed to his credit.

The beautiful bushland setting of Loganlea, south-east Queensland is now his chosen place of abode where he has an extensive garden — but still finds time to put his snappy fist or clear voice on the air almost every day. One can best describe him as an amateur who puts in a high key performance in a low key easy manner. His callsign fits in nicely with the work he performed in the PMG — viz Radio Frequency measuring — maybe you've already guessed. Yes, its VK4RF (Romeo Foxtrot or Radio Frequency) and his name is Fred J Lubach.

AR

MULTI PURPOSE CRIMPING TOOL

G 30040



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A MICROPROCESSOR CONTROLLED ANTENNA SYSTEM

Ralph Birrell VK3BIP
11 Turner Road, Strathfieldsaye Vic 3551

As satellite communication is becoming more commonplace it is desirable that antennas be automatically controlled to follow a satellite in its path across the sky. This will free the amateur from the problems of tracking and enable him to concentrate on communicating with his fellow amateur. This article describes a preliminary design for using a microprocessor for automatic control of an antenna.

THE PROBLEM

The 3 dB beamwidth of an antenna is usually several degrees. A five element yagi has a 3 dB beamwidth of about ·25° while a twelve element Yagi at 1296 MHz has a 3 dB beamwidth of about ·8°.

With parabolic antennas the beamwidth depends on the diameter and surface irregularities. Typical values are:

a) Frequency 1297 MHz
Diameter 3 m
3 dB beamwidth 5°
Power gain 30 dB
b) Frequency 5761 MHz
Diameter 3 m
3 dB beamwidth 2°
Power gain 38 dB
c) Frequency 10,369 MHz
Diameter 1 m
3 dB beamwidth 2°
Power gain 38 dB

These figures indicate that an antenna control system which can point the antenna axis to within ·2° of the actual satellite position at any time will suffer very little degradation of signal strength at the receiver input.

The tracking problem is three dimensional but can be simplified into a linear equation for the horizontal plane from 0 to 360 degrees and a parabolic equation in the vertical plane from 0 to 90 degrees. These two combined motions will give complete coverage of any point in the sky.

The vertical elevation above the horizon can be expected to be an inverted parabola of the type

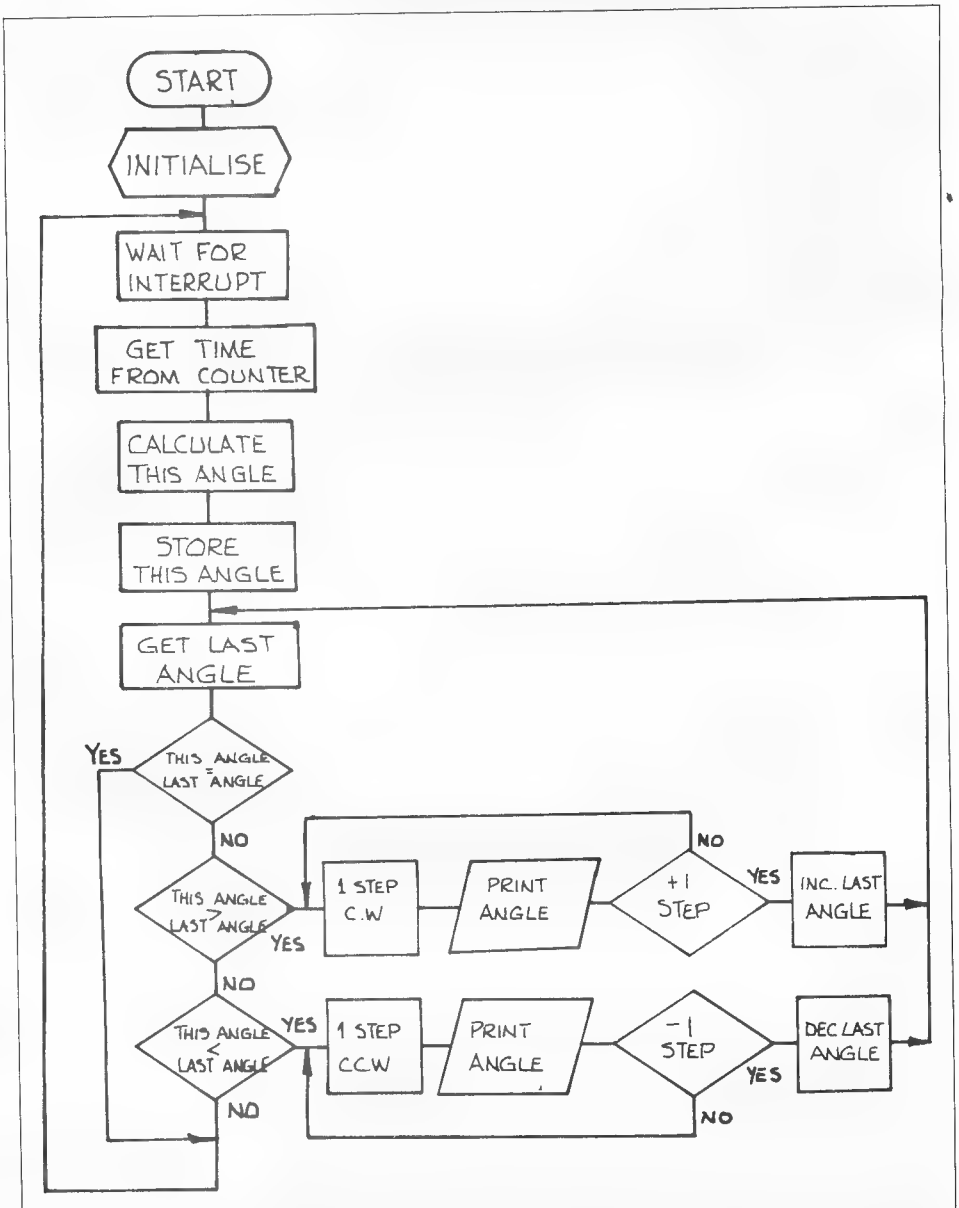
$$\Theta = AT - BT^2$$

where Θ = degrees above the horizon
A, B are constant values
T = time after the satellite rises above the horizon.

The ability of the computer to do arithmetic will determine how complex an equation can be followed.

For a preliminary design a period above the horizon of 100 minutes was chosen. This is of the same order as that expected for the phase III satellite in the southern hemisphere.

A feedback loop is used to check that the antenna has moved. If not a repeat instruc-



FLOWCHART OF MICROPROCESSOR CONTROLLED ANTENNA SYSTEM

tion is issued until the antenna moves as required. Alternatively an alarm could be given if the antenna fails to move.

A small parabolic dish antenna from a disposals radar system was available. This antenna has gearing for movement in both the horizontal and vertical planes and is suitable to prove the overall design.

CHOICE OF COMPONENTS

STEPPING MOTORS

Sufficient accuracy can be obtained using a stepping motor for each drive. The Philips motor type 9904 112 27001 has a step of 7.5 degrees, using a gear ratio of 75/1 the step becomes 0.1 degrees at the antenna.

The pull out torque at the antenna would then be about 6-7 newton metres.

With a Yagi or large parabolic antenna the torque required to move the antenna on its bearings is relatively small. The worst condition will be where the antenna is being acted on by wind gusts when the drive is required to move the antenna against the force of the wind or to hold the antenna against freewheeling. A brake can be controlled by the computer to be on and hold the antenna stationary against wind forces between the active periods of the drive and to leave the drive free during active periods.

STEPPING MOTOR CONTROLLER

A Philips controller chip SAA 1027 can be used to send out a pulse for each step of the motor. Another pulse can give forward or reverse direction as required.

MICROPROCESSOR

A National Semiconductor chip, the INS 8073 microprocessor chip is used. This device is an 8 bit microprocessor with a wide range of arithmetic (8 and 16 bit) with a tiny basic interpreter built in to the CPU in an internal 2.5 kiloword PROM.

The availability of Tiny Basic makes programming much more efficient and quicker than using machine language. Tiny Basic is a suitable language for control applications.

The chip is available on a board with various input/output ports from JED Microprocessors at a very reasonable cost. The chip is capable of integer arithmetic (to the nearest whole number) which is suitable for the stepping motor use.

A programmable timer is included on the board and this can be programmed to interrupt the processor at second, minute or hour intervals.

FEEDBACK CIRCUITS

A small rotary pulse generator could be used to check the movement of the antenna eg a Philips V 23465 digital shaft encoder with 5000 pulses per revolution.

A Sony Digiruler was available and this was adapted to measure circular motion by wrapping the magnetic strip on a wheel of suitable diameter, the wheel rotating with the antenna. The digiruler emits a pulse every 0.05 mm of movement of the strip past the reading head. The pulses can be counted with a 7492 chip and the computer can be programmed to check the movement after each step. The digiruler can sense forward or reverse rotation.

PROGRAMMING

The programmable timer was set to provide an interrupt to the processor at minute intervals. For the first trial a time of 100 minutes above the horizon was chosen. The constants A and B of the equation $\Theta = AT - BT^2$ can be chosen to give the required minimum elevation, for the period of 100 minutes, as required for any satellite.

The flowchart for the programme for the vertical movement is as shown in the illustration.

For the first trial the time and angle of elevation were printed on the console and the angle output to a LED display.

The programme was written in TINY BASIC with machine language subroutines to increment the time and to increment or decrement the angle as required. These subroutines are called up using a LINK instruction.

At each minute interval the processor calculates the value of Θ and steps the antenna until this value is reached by forward or reverse stepping as required.

After debugging, the programme was transferred to EPROM which was then plugged into the board with the programme starting at location 2000. The programme was started from the console.

After successfully proving the programme for elevation a new programme is being written which will enable movement for elevation and azimuth for follow any particular equation desired or to move the antenna to point to any position in the sky when the coordinates are fed in from a keyboard.

CONCLUSION

The INS 8073 microprocessor provides a low cost solution for the control of an antenna system to follow a given equation across the sky or to move immediately to point to a given point in the sky. The availability of the TINY BASIC language on this chip makes programming relatively simple and cost effective.

I will be happy to provide a copy of this listing to experimenters or alternatively programme an EPROM for anyone who wishes to seriously experiment in this field.

Editors Note: An SASE should be enclosed with any request for information from the Author.

URGENT!

Please let us know of clubs and schools etc. starting theory classes.

Where, when, how much and whom to contact.

Contact Brenda VK3KT.

TRY THIS

THE MICROWAVE OVEN TEST

John Hassell, VK6ZGF/NXX
77 Kalinda Drive, City Beach, WA 6015

Many vital pieces of amateur radio gear such as loading coils, antenna traps and RF chokes can be home made using odd bits of PVC piping or various plastic containers as coil formers. One drawback with this practice is that there is no way of knowing the dielectric properties of the PVC pipe or detergent bottle you may have on hand. This is especially a problem if the project is an antenna loading coil through which you intend to run the legal power limit of RF. If the plastic material has poor dielectric properties in strong RF fields, then at best you will end up with a lossy loading coil of indifferent Q, or worse, the whole thing will melt into a gooey mess under sustained high power.

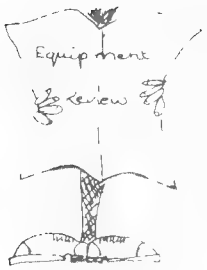
Here is an easy way to test the dielectric properties of various plastic items you may wish to press into service. The only major piece of test gear required is a microwave oven. The method is simple. Place a sample of the material in question on a paper plate. Pop this in the microwave oven for three minutes or so at high power. If the sample is a good dielectric it will remain cool or only get slightly warm. If the dielectric properties are poor, then the sample will get very hot or even melt. Hence the paper plate.

By comparing how warm various types of plastic get, it is possible to select the best for the job.

One word of warning. Be very sure no metal is in the sample you are testing. If you wish to test coax cable, remove the center conductor and ALL the braid. Even a small whisker of wire will get hot enough to set fire to the plastic being tested.

AR

JOIN A NEW MEMBER



EQUIPMENT REVIEW

Peter Gamble, VK3YRP
TECHNICAL EDITOR

THE PARAMETERS 7040 DIGITAL MULTIMETER

The most common piece of test equipment in an amateur's shack used to be a moving coil multimeter with a sensitivity of somewhere between 1000 and 20 000 ohms per volt. When a high impedance measurement was required, a VTVM was usually lifted down from the shelf, plugged in and allowed plenty of time to warm up and stabilise. With valve equipment the norm, these meters provided sufficient accuracy, usually within 2-5%, to build and service amateur radio equipment. But this is changing rapidly. Transistor and integrated circuit equipment often demands more sensitive and accurate measurements, and digital multimeters provide this with high impedance measurement and no 'warm up'. They are also becoming more affordable. One such digital multimeter is the Parameters Model 7040.

APPEARANCE

The 7040 is a hand size instrument built into a high impact ABS plastic case and weighs less than 400 grams. It also contains a metal shield to minimise RFI problems. The functions are selected by two dark coloured push buttons, and one of six light coloured push buttons is used to select the appropriate range. Change over from volts/ohms to current requires the hot lead to be moved to one socket for up to 2 amps and to a second socket for up to 10 amps.

The 13 mm, 3½ digit liquid crystal display is easy to ready from a wide range of viewing angles. A tilt bail enables the multimeter to be raised to approximately 30 degrees. A standard '216' 9 volt battery powers the instrument, and a socket is provided on the side of the case for an external regulated power supply. A single sheet leaflet lists the ranges, resolution, accuracy and operating instructions. It also includes a circuit diagram and parts list.

Overrange indication is provided by a leading digit of '1' and the remaining three digits blanked. A 'LO BATT' indicator came on when the battery voltage dropped below 7.1 volts.

SPECIFICATIONS

The basic accuracy of the multimeter is *quoted as* ±0.1% of reading +1 digit. The accompanying table has been extracted from the detailed specifications, and gives an overall picture of the ranges and accuracy of the instrument.

PARAMETERS 7040 SPECIFICATIONS SUMMARY

All accuracy figures quoted assume a one year calibration cycle and an operating temperature of 18°C to 28°C.

DC VOLTAGE:
Ranges: 200 mV, 2 V, 20 V, 200 V, 1000 V (max DC input)
Accuracy: ±0.1% of reading + 1 digit
Input resistance: 20 Mohm on 20 V to 1000 V ranges.
(Measured: 0.4 Mohm on 200 mV range, 1 Mohm on 2 V range)

DC CURRENT:
Ranges: 200 μA, 2 mA, 20 mA, 200 mA, 2 A, 10 A (max DC input)
Accuracy: up to 200 mA: ±0.5% of reading + 1 digit

AC VOLTAGE:
Ranges: 200 mV, 2 V, 20 V, 200 V, 750 V (max AC input)
Accuracy: ± 0.5% of reading + 5 digits
Frequency Range: Up to 20 V — 45 Hz to 500 Hz
200 V and 750 V — 45 Hz to 120 Hz
Input impedance: 10 Mohm shunted by less than 100 pF for 20 V to 750 V ranges
Response: Average responding, calibrated in RMS of a sine wave.

AC CURRENT:
Ranges: 200 μA, 2 mA, 20 mA, 200 mA, 2 A, 10 A (max AC input)
Accuracy: up to 200 mA: ± 1% of reading + 5 digits
2 A, 10 A ranges: ± 2% of reading + 5 digits
Overload protection: as for DC.

RESISTANCE:
Ranges: 200 ohm, 2 kohm, 20 kohm, 200 kohm, 2 Mohm, 20 Mohm
Accuracy: 2 kohm-200 kohm, ± 0.3% of reading + 1 digit
2 Mohm: ± 1.0% or reading + 1 digit
20 Mohm: = ± 2.0% or reading + 1 digit
Maximum DC source voltage: High — 2.8 V, Low — 280 mV

HOW IT PERFORMED

A series of tests were carried out, including comparisons with a more elaborate digital multimeter. A number of DC voltage and current tests were performed over the range 100 μV to 20 volts and 5 mA to 0.5 A. No problems were encountered, and accuracy on a comparative basis was well within specifications. The linearity was checked across ranges and was within ±1 digit. The voltage drop across the meter when it was measuring current was checked and found to be 0.25 volts at full scale for currents up to 200 mA. However, this rose rapidly on overrange current values.

An audio oscillator was first used for AC voltage tests, and a convenient frequency of 1 kHz selected. The two DMMs were connected and a significant difference noted in the readings over a wide range of voltages. Connections were double checked and when no explanation could be found, the specification leaflet was consulted! It was here that the explanation was found — accuracy was maintained only up to 500 Hz. Other digital multimeter specifications were consulted and all told a similar story. The frequency response was then investigated and the following results noted for a nominal 1.500 volts:

Frequency	Reading	Difference
500 Hz	1 495 V	0.3%
1 0 kHz	1.470 V	2.0%
2 5 kHz	1.398 V	6.8%
5.0 kHz	1.235 V	17%

The 3 dB point was around 7 kHz. Thus the DMM can be used for approximate comparative measurements over the majority of the audio range, with absolute measurements being confined to below 500 Hz. A number of tests of 50 Hz AC voltages over the range 0.2 to 20 volts were made, and again, accuracy on a comparative basis was well within specifications. Tests were also made on typical audio signal voltages. However, the readings were confused, as the sampling rate, about 3 per second could not cope with a rapidly varying voltage. (The more elaborate DMM also suffered from the same problem). No AC current tests were performed.

A variety of resistors were measured, including a number of 1% types, and accuracy on a comparative basis was well within specification. The 7040 provides a choice of two source voltages for resistance measurements — 2.8 volts and 280 millivolts. The low voltage is useful for in-circuit component checks in the vicinity of semiconductor components, as it is below the 'turn-on' threshold of semiconductor devices. The higher voltage gave better results, especially on low and high resistances.

CALIBRATION PROCEDURE

Recalibration requires a 190 millivolt DC and pure sine wave AC source. The re-

adjustment procedure, having obtained an accurate source, is simple — adjustment of two potentiometers, one for DC and one for AC.

ACCESSORIES

The multimeter was supplied in foam packaging, along with a 9 volt battery, a pair of test leads, and an instruction and specification leaflet.

CONCLUSION

A digital multimeter is a useful addition to the test equipment in an amateur shack once its idiosyncrasies are mastered. As with any piece of sophisticated test equipment, compared to a conventional multimeter, it takes a little time to learn its full potential. The Parameters 7040 is a versatile instrument that can make life a lot easier — no more misread scales, probes round the wrong way, needles embracing the stops, and so on. Its accuracy, resolution and sensitivity are more than satisfactory for amateur purposes, and at a quoted 100 hours from a carbon-zinc cell, or 200 hours from an alkaline cell, it is economical to operate. Any disadvantages? Well, a good RF probe, say good to 500 MHz would be nice!

The test instrument was supplied by Parameters Pty Ltd, of 53 Grosvenor Street, Mordialloc, Victoria. The Sydney Office is at 41 Herbert Street, Artarmon, NSW.

AR

ANOTHER COUNTRY

Alan MacLean VK3ASL
1/138 Bluff Road, Black Rock, Vic 3193

Whilst on a relaxing holiday the opportunity arose to make the holiday a mini DXpedition. With a little resourceful thinking antennas were quickly erected and a very enjoyable time was spent on the bands to make a simple holiday into a memorable time.

My XYL and I were travelling north on a holiday, when we found ourselves at Port Macquarie from where there is a regular air service to Lord Howe Island.

My FT101 was in the car with some home brew helical whips, but if I took the rig to the island the whips wouldn't be much use (without the car) so I began to think of what else I could use for an antenna.

Before leaving Port Macquarie I purchased a reel of light nylon fishing line and arranged for the owner of a TV shop (who also happened to be an amateur) to supply me with 10 metres of hook-up wire soldered to the centre conductor of a Belling Lee plug.

Our accommodation at the island was a self contained flat which had some nicely placed palm trees about 10 metres tall. I tied a piece of coral to the fishing line and threw it over a palm, then attached the hook-up wire to the fishing line and hauled it up the tree.

A piece of galvanised wire poked into the ground made an earth connection and I attached this to the earthy side of the Belling Lee plug with some of the hook-up wire. The centre of the plug was, of course, already soldered to the hook-up wire, so now I had a rough 40 metre vertical antenna.

Next, the rig was installed in the flat and connected to the 230 volt power. I had brought my light weight home brew SWR bridge which had Belling Lee sockets, so I fed some RF through the bridge to the antenna.

The antenna was hauled up and down a few times and bits snipped off the top until the SWR was reasonable. Then I called CQ.

It was just on 6 PM EST and strength 5 reports were received from Brisbane, Tweed Heads and Adelaide. Signals improved by 8 PM when strength 9 reports were given by several VK3s.

Next day we met Dick (VK2AGT) and Noell Hoffman. Dick explained that Lord Howe Island was a separate country from the rest of VK for DXCC purposes and that if I came up on 20 metres, I could work a lot of DX.

I scrounged some more hook-up wire and another Belling Lee plug from the island's other resident amateur, Ken VK2BKE, with the aim of making up a 20 metre antenna.

Using the 40 metre antenna as a measure, I cut off two pieces of wire, guessed as being two quarter waves on 20 metres, plus a bit for luck. Using Dick's soldering iron, the Belling Lee plug was fixed as a centre insulator between the two wires to make a dipole on 20 metres.

The centre of the dipole and the co-ax were plugged into the SWR bridge and it was hauled up the palm tree with the fishing line and the ends of the wires were tied back to some bushes with some of the fishing line to make an inverted vee.

The ends of the vee were trimmed to get the SWR good enough to go on the air. The SWR bridge was put back at the bottom of the co-ax and thirty countries were worked during the next four days.

On the fifth day I turned on the rig, but it was very quiet — not even any noise. On looking out the window, the reason was soon apparent. The antenna and co-ax had disappered — spirited away in the night!

I guess I must have been causing some BCI to someone. It certainly wasn't TVI, because one of the delights of Lord Howe was that there was no TV to interfere with.

That was a bit distressing. Now all I had was about 2 metres of co-ax and about the same length of hook-up wire. An amateur is supposed to be resourceful and I was determined that no antenna snitcher was going to keep me off the air. So back to my friendly supplier of hook-up wire.

The plan now was to make up a 20 metre vertical that could be suspended from a palm tree and retracted into the flat at night for safe keeping.

Using what appeared to be 9 inch vinyl tiles on the kitchen floor as a measure, I cut off 5 metres of wire to make a vertical plus the usual bit for luck. The wire was soldered to a Belling Lee plug and trimmed as before. The vertical wasn't as good as the inverted vee, but it managed to pull in thirteen countries including five new ones.

Back home later, when I measured the antenna, I found it was 4.57 metres from top to plug and had 1.05 metres of earth lead. It was fed with 50 ohm co-ax. The dimensions bear no relation to anything I've heard of before — but it worked.

For many of my contacts, it was their first with Lord Howe, and a number of them said 'Thanks for a new country OM.' I got several new countries myself — including Lord Howe Island (thanks to Dick, VK2AGT) and joined the select band of people who have worked Lord Howe FROM Lord Howe.

There are frequent air services to Lord Howe Island from Sydney and Port Macquarie. The island is administered by New South Wales and is located in the Pacific Ocean about 700 km north east of Sydney. Apart from being a first class DX location, it's a wonderful place to have a holiday and — another country.

AR

'SQUARE-TWO' CONVERTER

Drew Diamond, VK3XU
43 Boyana Crescent, Croydon, Vic 3136

The 'Square-One' receiver described in AR January-March '83 covers 1.8 to 2.0 MHz. Converters will be required to tune other frequency bands. This converter design may be used with any receiver which tunes 1.8 to 2.0 MHz or more.

An example of this application may be for use with a general coverage receiver which tunes perhaps 0.55 to 30 MHz in four or five bands with a 455 kHz IF. Such a receiver may provide adequate performance at low frequencies, but have very poor bandspread, stability and image rejection at higher frequencies. However, by preceding the receiver (now a tunable IF) with a converter, the bandspread, stability and image rejection characteristics of the 1.8 to 2.0 MHz range are substantially preserved whilst tuning the higher frequency bands.

The construction of the Square-One receiver allowed space for converter(s) in the under chassis area. With this part added, the receiver becomes a 'full-blown' amateur band receiver. If all bands are not required, then only those bands actually needed may be provided for, and the other bands added later as desired.

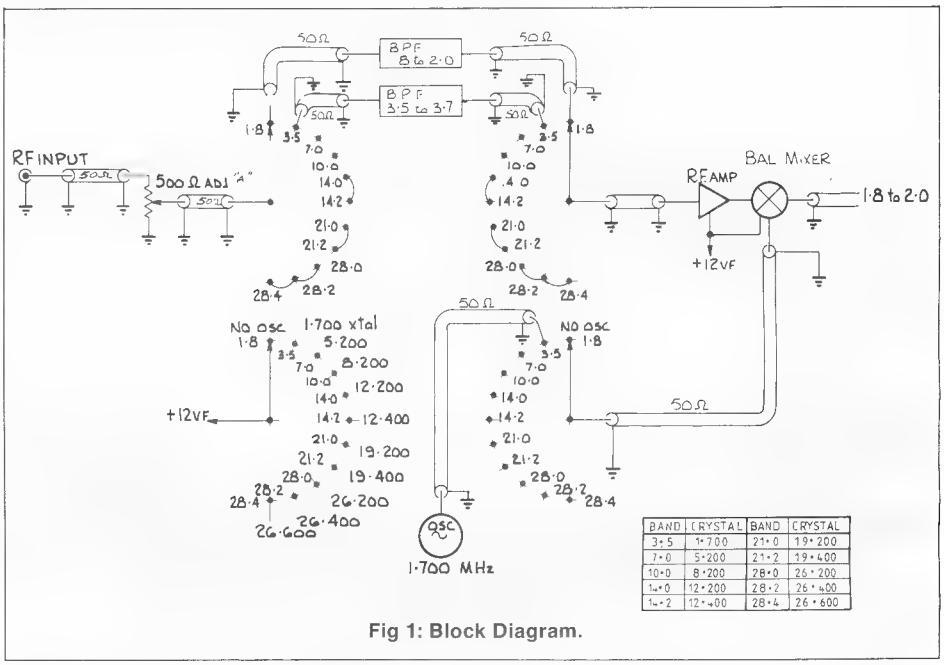


Fig 1: Block Diagram.

PERFORMANCE

The Square-Two converter when used with the Square-One receiver yielded the performance shown in Table 1.

Signal handling ability is quite good. On-air tests to date have yielded no incidents of cross modulation, 'Square-law effect', or bothersome internally generated intermodulation distortion products.

The second IF (9 MHz) was measured in excess of -100 dB for every band. Only one internally generated spurious signal was noted; a very weak sub-microvolt spur on 28.143 MHz.

BLOCK DIAGRAM DESCRIPTION

A band-pass filter (BPF) is required for each band. They prevent the introduction into the mixer of frequencies which are images of the desired frequency, and reduce overloading of the RF amplifier by strong out of band signals. The broadband RF amplifier provides gain to incoming signals before they are applied to the singly balanced mixer.

The oscillator input port of the mixer is supplied with a crystal derived and filtered signal which heterodynes the incoming signal to 1.8-2.0 MHz. For example, to receive 7.0-7.2 MHz, the crystal oscillator must supply 7 - 1.8 = 5.2 MHz. Therefore, an incoming signal on 7.0 MHz will be heterodyned to 1.8 MHz, and a 7.2 MHz to 2.0 MHz. The crystal is always 1.8 MHz less than the lower edge of the band to be received. For input frequencies of 1.8 to 2.0 MHz, no crystal is required. On this band, the signal must negotiate a BPF to prevent overload by BC stations, and is passed by the mixer (remember, it is singly balanced, and the signal frequency is not suppressed). A look at the overall block diagram will show how the entire receiver operates.

TABLE 1:

Frequency Band	Sensitivity for 10 dB S + N: N	1st IF Rejection (1.8 MHz)	Image Rejection
1.8-2.0	*-122 dBm (0.2 uV)*	*NA*	*Greater than 100 dB*
3.5-3.7	*-118 dBm (0.3 uV)*	*70 dB*	*NA*
7.0-7.2	*-118 dBm*	*78 dB*	*66 dB*
10.0-10.2	*-119 dBm (0.25 uV)*	*78 dB*	*56 dB*
14.0-14.2	*-119 dBm*	*83 dB*	*50 dB*
21.0-21.2	*-118 dBm*	*91 dB*	*47 dB*
28.0-28.2	*-120 dBm (0.23 uV)*	*100 dB*	*45 dB*

CIRCUIT DESCRIPTION

The input BPF is necessary to pass only the band of interest. Three top-coupled tuned circuits are used to cover each band, and are switched into operation with two wafers of a four wafer, 11-position switch. Capacitive dividers provide input and output impedances of about 50 ohms so that signals may be routed via miniature 50 ohm coaxial cable. The broadband RF amplifier and mixer are identical to those used in the Square-One receiver. The amplifier has a gain of about 10 dB, and employs a bipolar transistor with feedback. This stage is not easily overloaded or damaged by excessively large signals, and has good linearity.

The mixer is singly balanced, and has about 0 dB gain. U1 a CA3028 differential pair is driven in push-pull via T2. 100 ohm resistors R17 and R18 terminate the balanced secondary of T2 so that the input impedance of the mixer looks like 50 ohms. On all bands except 1.8 MHz, a crystal derived signal is injected into the current source transistor of U1 in common mode, so little or no oscillator signal

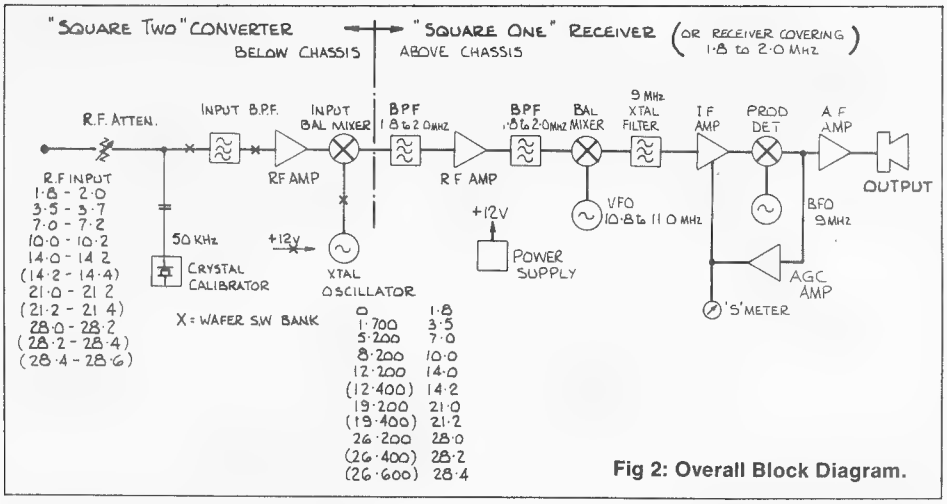


Fig 2: Overall Block Diagram.

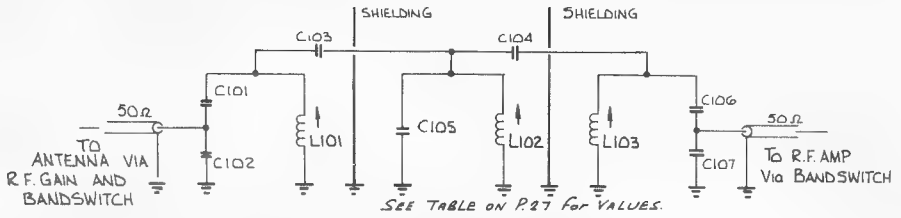


Fig 3: Input Bandpass Filter.

appears at the output of the mixer. 1.8-2.0 MHz signals (first IF) are coupled to the tunable IF via T3. 100 ohm resistors are again used to obtain correct impedance levels. R19 and R20 have the additional function of absorbing mixer products which are not at the IF, so reducing their amplitude and the danger of degrading dynamic range. A diplexer is therefore not required.

An individual crystal oscillator is required for each HF band. This method was used to avoid switching crystals (a messy business). Also, some crystals require a different circuit arrangement for correct operation. The 1.700 MHz crystal for the 3.5 MHz band requires a Pierce oscillator, those for 7.0 to 21 MHz require a Colpitts, and those for the 28 MHz band require an overtone circuit. The crystal frequency applied to the mixer must be very clean to avoid the production of spurious signals, and the reception of harmonic images. For example; on the 7 MHz band the crystal operates on 5.200 MHz. The second harmonic of the crystal (10.4 MHz) may mix with an unwanted signal on 8.6 MHz and produce an IF of 1.8 MHz (10.4 - 8.6 = 1.8). The input BPF will do a good job of attenuating the unwanted signal, but some very strong signals exist in that band, and would be attenuated only 40 or 50 dB, and may appear along with the wanted signals. By reducing the harmonic content of the crystal frequencies, the level of unwanted signals from this cause will be greatly reduced — in this case about 70 dB. Therefore each crystal

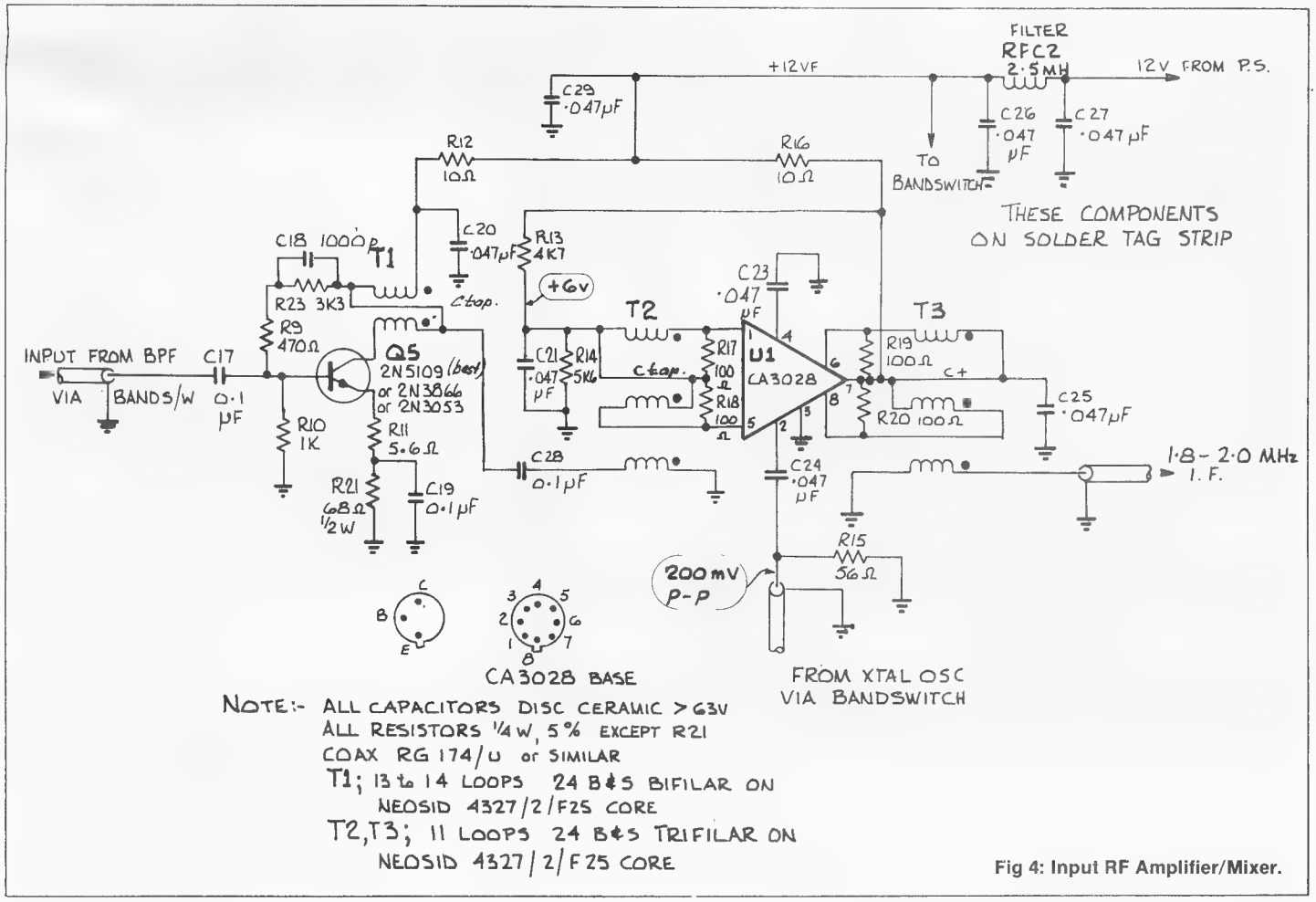
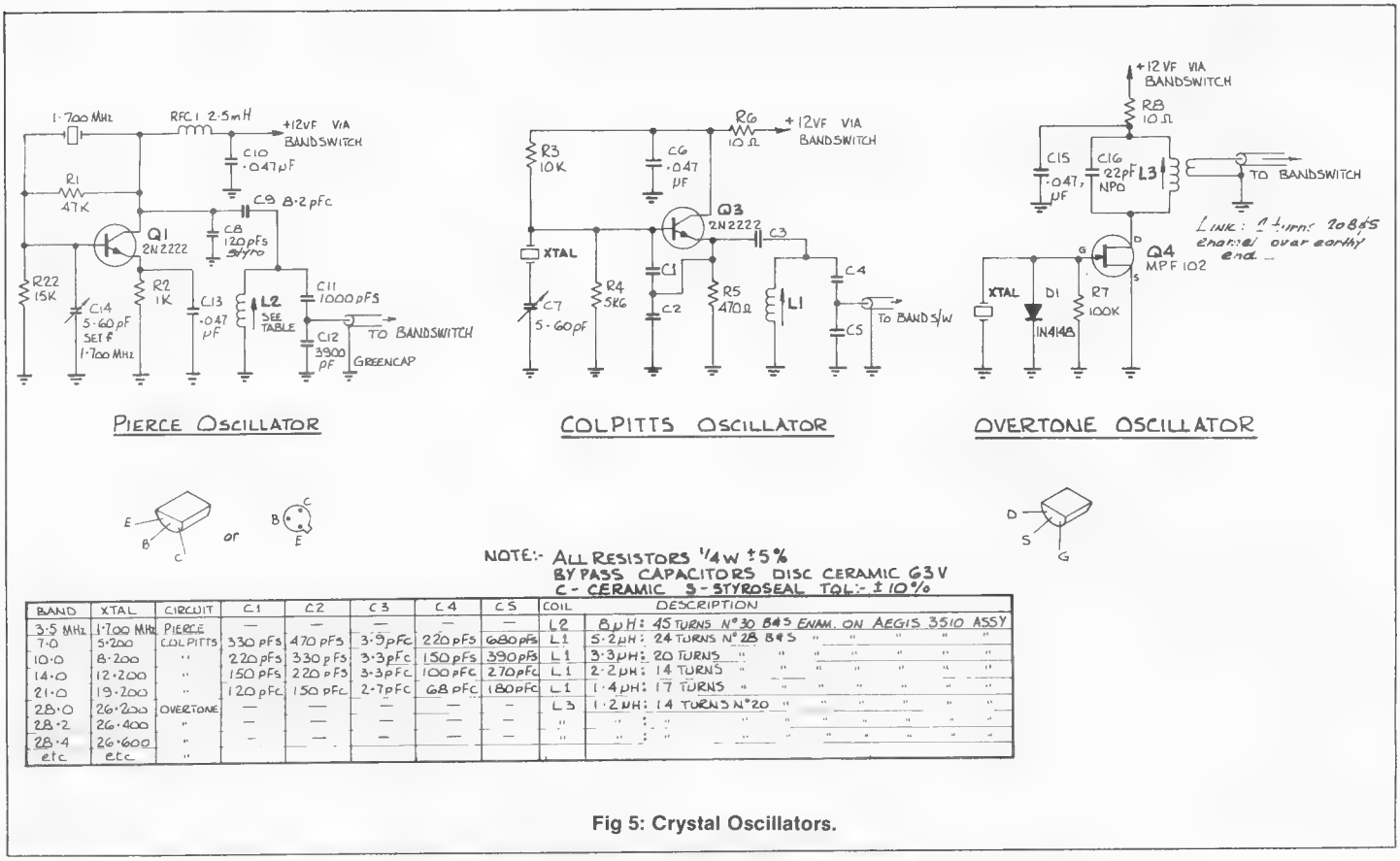


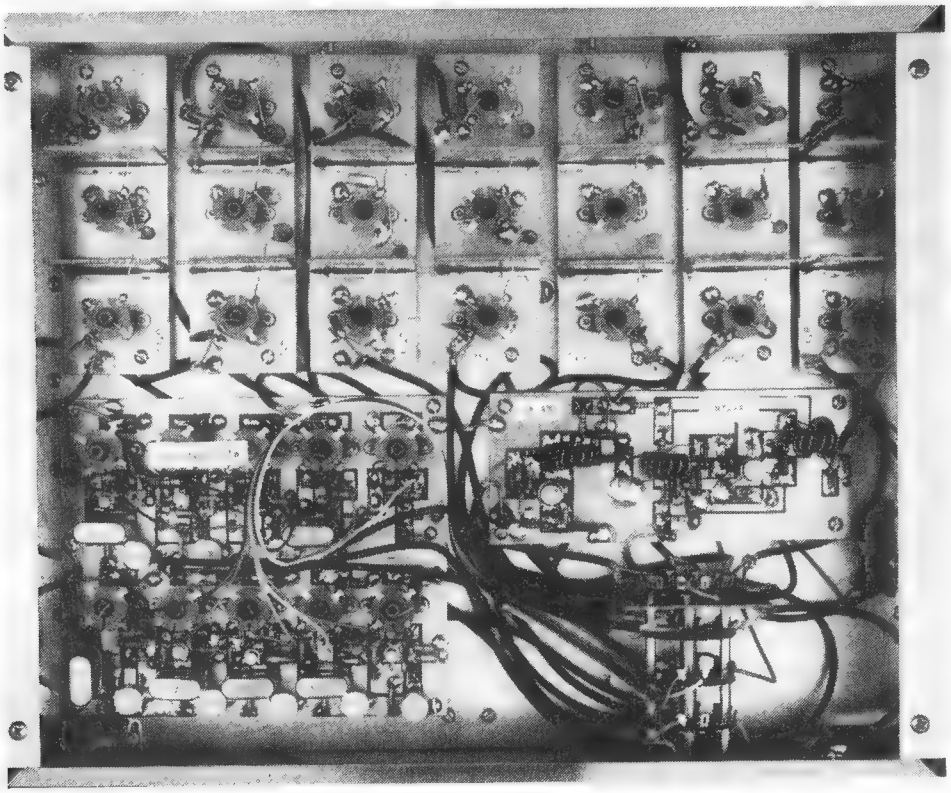
Fig 4: Input RF Amplifier/Mixer.



NOTE:- ALL RESISTORS 1/4W ±5%
BYPASS CAPACITORS DISC CERAMIC 63V
C - CERAMIC S - STYROSEAL TOL:- ±10%

BAND	XTAL	CIRCUIT	C1	C2	C3	C4	C5	COIL	DESCRIPTION
3·5 MHz	1·700 MHz	PIERCE	—	—	—	—	—	L2	8µH: 45 TURNS N°30 B&S ENAM. ON AEGIS 3510 ASSY
7·0	5·200	COLPITTS	330 pFS	470 pFS	3·9pFc	220 pFS	680 pFS	L1	5·2µH: 24 TURNS N°28 B&S " " " " "
10·0	8·200	"	220pFS	330 pFS	3·3pFc	150 pFS	390 pFS	L1	3·3µH: 20 TURNS " " " " " " "
14·0	12·200	"	150 PFS	220 pFS	3·3pFc	100 pFc	270 pFc	L1	2·2µH: 14 TURNS " " " " " " "
21·0	19·200	"	120 pFc	150 pFc	2·7pFc	68 pFc	180 pFc	L1	1·4µH: 17 TURNS " " " " " " "
28·0	26·200	OVERTONE	—	—	—	—	—	L3	1·2µH: 14 TURNS N°20 " " " " " "
28·2	26·400	"	—	—	—	—	—	"	" " " " " " "
28·4	26·600	"	—	—	—	—	—	"	" " " " " " "
etc	etc	"							

Fig 5: Crystal Oscillators.



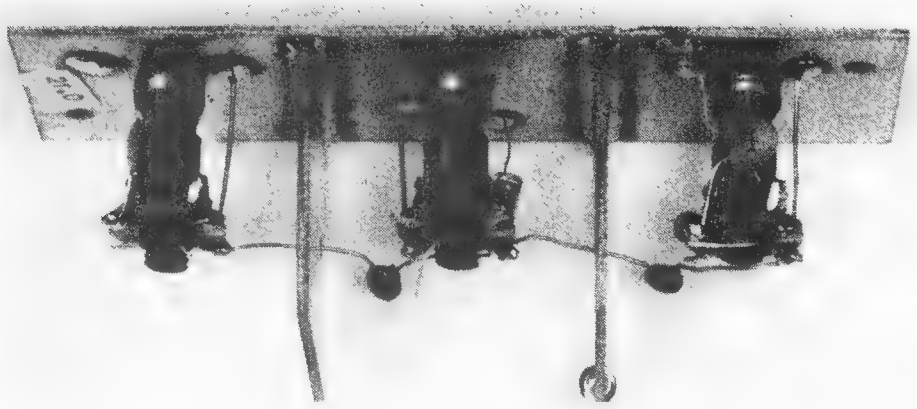
oscillator is followed by a tuned circuit to clean up the oscillator signal before it is applied to the mixer.

During final testing of the complete receiver, it was found that the residual noise level of 3.5 MHz was rather higher than expected. It was found that noise from the power supply was being injected into the RF amplifier via the +12 V rail. This problem was eliminated by the inclusion of RF filter; C26, RFC2, C27. So +12 VF designates a filtered supply.

CONSTRUCTION

The RF amplifier and mixer components are accommodated upon the copper side of a home made double sided PCB, and the oscillator assembly upon a second board. It is therefore not necessary to drill holes for components. Each BPF is constructed upon a double sided board with a square of PCB material screening each section of each filter. A small hole will be required in each screen so that the leads from the top coupling capacitors may pass through the screen. See photo. Most of the image rejection performance of the receiver derives from the input BPF's, so care must be taken in their construction.

Those who have made the Square-One receiver will have already developed their own way of winding coils upon the Aegis 3510 formers. It is a good idea to firstly select which of the four tags are to be used to terminate the start and finish of each coil, and stick to those tags for every coil. This will reduce the likelihood of any problems later on. Sufficient wire should be removed from the wire spool before fixing the spool in a vice. The start (top) of the winding may be soldered to the selected tag. With the wire taut, and holding the former at the top and bottom with its axis parallel to the floor; the required number of turns are wound onto the former. With the layer complete, the end (finish) may be firmly wrapped around one of the feet and the wire cut off. All coils should be immediately labelled with a pencil upon the tag ring to identify it. Shellac or clear nail varnish must be applied to each winding to hold them in place. When dry, the finish ends may be unwrapped from the foot, cut to length and soldered to the selected tag. A two or three cm



Band	C101, 105, 106	C102, 107	C103, 104	L101, 102, 103
1.8	1000 pF Styro	4700 pF Cer	47 pF Cer	8 uH: 45 turns No 30
3.5	470 pF Styro	2200 pF Cer	22 pF Cer	4.2 uH: 26 turns No 28
7.0	220 pF Styro	1000 pF Cer	10 pF Cer	2.1 uH: 14 turns No 28
10.0	180 pF Styro	680 pF Cer	6.8 pF Cer	1.5 uH: 17 turns No 24
14.0	120 pF Styro	470 pF Cer	4.7 pF Cer	1.0 uH: 14 turns No 24
21.0	82 pF Styro	330 pF Cer	3.3 pF Cer	0.8 uH: 9 turns No 22
28.0	56 pF NPO Cer	220 pF Cer	2.7 pF Cer	0.5 uH: 7 turns No 22

Wire is B & S enam. All coils wound on Aegis 3510 Assemblies.

length of elastic (cotton removed) should be inserted with each slug so that they do not move after adjustment. As up to 31 coils will be required, it is cheaper to buy them from the maker, whose address is given at the end of this article. Some spares should be ordered in case of breakages.

The RF amp/mixer should present no particular problems. The trifilar broadband transformer is made in the same manner as those in the Square-One. T2 and T3 are made as follows: Take three 350 mm lengths of 24 B & S enamel wire, lay them parallel to each other, twist them together at one end, and place that end of the group in a vice. Starting at the vice end of the group, draw a cloth through them to remove any wrinkles. Now twist the free ends together and fix them firmly in the chuck of a hand drill. Turn the drill whilst keeping the wires taut until there are about three twists per cm, then give the drill a tug to set the twists, and remove the twisted group. Carefully thread the group through a Neosid 4327/2/F25 toroidal core until there are about 11 loops. Leave about 2 cm of wire at each end of the winding, and remove about 1 cm of enamel from each wire. A multimeter set to ohms can be used to identify the separate windings. It is essential that the end of one winding be connected to the start of another winding to form the centre tap for the secondary of T2, and the primary of T3. Bifilar transformer T1 is made in a similar manner. Once again, it is essential that the end of one winding is connected to the start of the other winding to form the centre tap.

The crystal oscillator board assembly can accommodate eight fundamental oscillators (Pierce and Colpitts) and two overtone oscillators. The final number of oscillators depends on the needs of the user. The photo shows the oscillator board fitted with one Pierce for the 3.5 MHz band, seven Colpitts (with crystals installed for 7, 10, 14 and 21 MHz bands), leaving three spare, and one overtone crystal installed for 28 MHz leaving one spare. The crystal frequencies required for each band are calculated: Y = f – 1.8 where f is the lowest frequency of the band required, eg to tune 28.0 to 28.2; Y = 28 – 1.8 = 26.200 MHz.

It was originally stated in the Square-One article that a 3-section, 11-position wafer switch would be required for the bandswitch. However, as it turned out, a 4-section, 11-position switch was required. The acquisition of this switch must be left to the resources of the individual, although one or two sources exist. It may be necessary to buy a 3 x 11 and a 1 x 11 switch and add the bank from the 1 x 11 to the 3 x 11 switch. To do this: undo the two rear nuts and carefully remove all the wafers and spacers. Note this positioning of the little fibre washers and the orientation of the wafers. Do the same with the 1 x 11 switch. Cut two of the spacers in half. This will allow the switch to be re-assembled as a 4 x 11 one. Make the wafer nearest the front that which switches the crystal oscillators. The next wafer — close spaced, should be that which switches the +12 VF supply to the oscillators. This leaves plenty of room to terminate the miniature coax's for the input BPF's. As will be seen in the photo in Part 1, a square piece of PCB should be inserted between the wafers for the BPF, and used to terminate the braids of each coax and provide a shield between these two wafers. The output side of the BPF's should terminate on the rear wafer. The clicker plate itself may be used to terminate the braids of the coax's which supply the oscillator signals. RG174/U miniature coax may be used for all the coax runs. About seven metres will be required if all bands are to be provided. Ribbon cable was used for the +12 VF supplies to the oscillator assembly

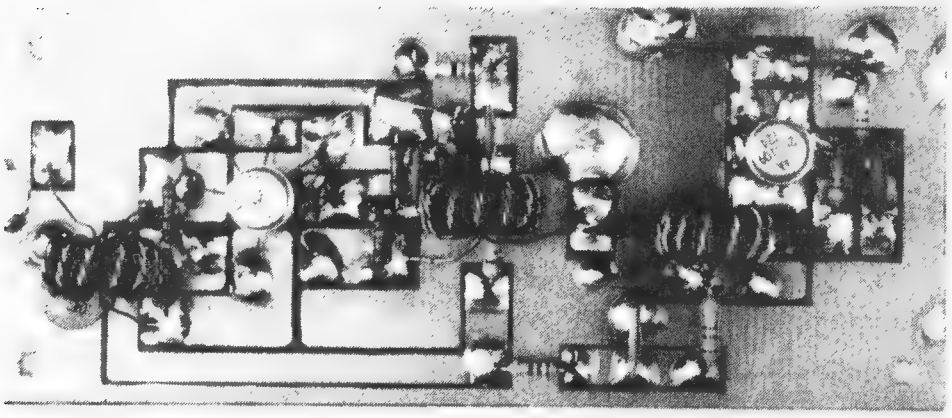
Each PCB and BPF may be mounted upon the under chassis area of the Square-One receiver with threaded spacers. These may be fixed to the chassis with Araldite to save the problem of drilling holes in the chassis with assemblies already mounted on the other side. A short length of braid should be soldered between the oscillator assembly and the RF amplifier.

The crystals should be socketed A cheap source of sockets are pins removed from miniature tube sockets. Slip the pins onto an old crystal to help with soldering the pins to the PCB with the correct spacing

ALIGNMENT

A signal generator which covers the HF bands is desirable, but not essential to get the converter section going. If a generator is available; apply about 10 uV to the input with the RF gain pot set to maximum and see if the signal can be found where expected. The middle section of each BPF will provide the sharpest peak when tuned, and this one should be tweaked first to obtain a signal for each band being so adjusted. The generator level may be steadily reduced whilst adjusting the three sections of the BPF. The two outside sections will be rather broad in their response. Check the sensitivity at each end (1.8 and 2.0 MHz) to make sure the sensitivity reponse is reasonably flat. Some compromise in settings may be necessary to obtain gain flatness.

If no signal can be obtained at all: check that the oscillator for the problem band is operating. The trimming capacitor for the Colpitts circuits must have some C engaged in order for the oscillator to work. With a weak signal applied, it should be possible to peak the oscillator coil for strongest signal response for each band. It may be found that the overtone circuit will not work immediately.



Try adjusting the slug. A point should be reached where the oscillator 'plops' into life, and there will be another point where it will drop out again. Set the slug at some point between these limits where the signal peaks. Check that the oscillator will start each time it is switched out and in. It will be found that the actual frequency will now be very close to that marked on the crystal.

If no generator is available; the calibrator signal (from the Square-One) may be used to align each band. The 50 kHz signals are strong enough on most harmonics to allow something to be heard. Pick a fairly strong one, and peak the BPF coils as described above. The oscillator coils may also be peaked using the calibrator signal. When the BPF's have been adjusted, the crystal oscillators may be brought onto frequency, either with the help of a counter, or more simply by adjusting each crystal trimming capacitor so that each band lines up with the calibrator signal at the same point from band to band. It will not be possible to accurately align the 28 MHz crystal, but the error will be small, and the cal pot on the Square-One will allow for this.

The converter may also be adjusted using signals and noise from an antenna. However, this method is more difficult of course due to fading etc. With a reasonable antenna connected to the input, the receiver should sound lively, provided of course that the chosen band is in fair shape.

Please send a large SAE for a copy of circuit board artwork and component location diagrams to the address stated at the beginning of this article.

Photography: Peter Dalliston and Ken McLachlan.

References: Solid-State Design — ARRL.
ARRL Handbook, 1982 and 1980.
Radio Handbook — Editors & Engineers.
Radio Communication Handbook — RSGB.

Parts sources:
Coil formers, RFC's: Aegis (makers), Magraths.
Toroids: Magraths, Ellistronics, Watkin Wynne.
CA3028: Magraths, Ellistronics, Rod Irving.
Band Switch: Radio Parts, Magraths.
Crystals: J & A Crystals.
Coax: Acme Electronics, Ellistronics.
Enamel Wire: Magraths, Ellistronics.
Magraths: 55 A'Beckett St, Melbourne, 3000.
Ellistronics: 289 LaTrobe St, Melbourne, 3000.
Aegis: 141 Christmas St, Fairfield, 3078.
Rod Irving: 48 A'Beckett St, Melbourne, 3000.
Radio Parts: 562 Spencer St, W Melbourne, 3003.
Watkin Wynne: 32 Falcon St, Crows Nest, 2065.
J & A Crystals: 20 Delville St, Mentone, 3194.
Acme Electronics: 2 Canterbury Rd, Kilsyth, 3137.

AR

MULTI-PIN PLUGS FOR SURPLUS GEAR

John Hassell, VK6ZGF/NXX
77 Kalinda Drive, City Beach, WA 6015

Most military surplus gear is inter-connected by cables with multi-pin plugs. Usually by the time the gear arrives in the amateur shack the essential cables and plugs are long missing and the equipment has to be haywired together to get it working.

Here is a simple way to make multi-pin plugs, using the socket in the equipment as a template for the pin spacings.

1 *Tape a square of waxed lunch wrap firmly over the socket.*

2 *Cut from a suitable gauge of bare copper wire the required number of pins. The length of the pins will vary with the type of socket, but about 2 cm will do for most applications. Trim as needed later. Select a wire gauge to give a firm fit in the socket holes.*

3 *Push the wire pins through the wax paper into the socket holes. Check that the pins do not protrude too far through the socket.*

4 *Find a plastic jar or wide mouthed plastic bottle with plastic screw lid. The diameter of the jar should be slightly larger than the socket. Cut the top off the jar about 1.5 cm down from the lid. Drill a hole through the lid to take the cable, and grommet if needed.*

5 *Place the top section from the jar over the socket, centre carefully and tape in place. Ensure the threaded end is uppermost.*

6 *Mix some epoxy filler. (I use PlastiBond.) Pour the epoxy into the jar section and fill until about 5 mm of the pins remain exposed. Allow to set, then withdraw the newly-made plug from the socket. Peel off the wax paper.*

7 *Slide the jar lid on to the cable. Solder the cable wires to the plug pins. Screw the lid on to the body of the now-completed plug.*

NOTE. Many multi-pin plugs and sockets use a keyed centre pin to ensure that the plug and socket are mated correctly. As our new plug lacks this refinement it is best to mark with paint the correct orientation of the plug in the socket.

AR

Figure 1.

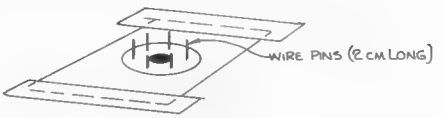


Figure 2 and 3.

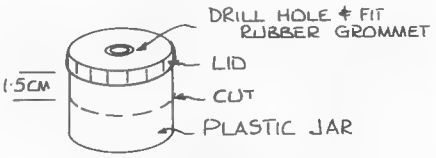


Figure 4.

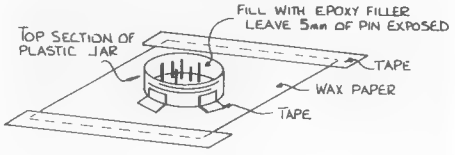


Figure 5.

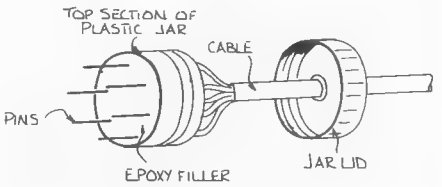


Figure 6.

DX — WHO PAYS?

Neil Penfold VK6NE
388 Huntriss Road, Woodlands, WA 6018

DXers of the amateur fraternity all have their answers to the questions of how to obtain QSL cards from the desired contact, but let us try and have some answers to the questions raised by the DX station.

An amateur decides to visit an island which has no resident amateur population, for a three months holiday. The island has only recently gained its independence and is off the beaten tourist track.

After various flights by aircraft of vintage years and the customs people being very curious about the transceiver, our amateur is duly installed in a comfortable room overlooking the beach. There is no TV or other entertainment after dinner and as our man is of sober habits and lives a quiet life at home, this looks like a great location for a quiet holiday.

After dinner he decides to try and listen for amateur contacts. The usual long wire strung to a nearby coconut tree, through a tuner to the transceiver and he is ready. The band seems quiet enough — usual gaggle of voices between 200 and 210, a net operating a few kilohertz lower, no recognisable DX callsigns so let's try 195, as he's in a remote location which he considers should count as DX.

His first hour of operating brings a plithora of calls, all calling at once, in an effort to make the contact. This is great. At home on the mainland his calling of "CQ-DX" has only produced one new country in six months and many calls from the more populous areas of the world. Now already in the log are four relatively rare stations and one he's never heard before.

Granted, there hasn't been anyone operating from this island during the last six years but he hasn't anticipated being this popular.

After four hours and eight pages of his log book used, propagation fizzles out and he's ready for bed, contemplating how great it was to be wanted by so many operators. The questions of "who is your QSL manager" and the repy "QSL to my home call" really impressed him. And so it's off to sleep thinking of how he may help his new found fellow DXers by doing some more operating. Perhaps more than he originally thought when he carried his transceiver to the island and the muddling about obtaining a licence to operate. Maybe this is what DXing is really about, not sitting at home hoping some rare station will come back to his "CQ-DX" call or trying to compete with everyone else that wants him too, some of whom are always bragging about how they worked a rare one which he didn't even hear, let alone work.

The weather is great, accommodation and meals fantastic, what more could one want from life, but the three months holiday starts to zip by, with the QSOs mounting every day. As experience is gained in handling the dog piles the QSO rate increases. The suntan is now deeply embedded and his middle appears a little more rotund than when he arrived on the island.

Departure day duly arrives, clothes and gear are packed along with all those log sheets. Never expecting to have so many contacts, the lone log book he brought with him had to be supplemented with hotel stationary, small school exercise books obtained from the local co-operative store and the back of a wall calendar — the only writing material to be found one evening when all other paper had run out.

On the plane home, watching the pretty hosties and sipping his last duty free drink, the figure of 19,256 QSOs kept appearing in his mind. Of his four years of amateur activity, his total QSOs at home had only filled one and a half log books — nothing compared to the paperwork in his luggage.

Home sweet home!! — One of the first sights to greet him in the shack was a grocery carton. Mum had put all his mail in it and it was half full. Mum had already mentioned that the postman had asked "what was Bob selling".

Slitting open a few envelopes and noting their contacts, Bob was amazed. There were two with US dollar bills, three with four International Reply Coupons (IRC) in each and two with just cards and a note on the bottom of the card reading "pse QSL direct". There must be over two hundred envelopes in the carton.

The next day brings another deluge of mail and by the end of the first week at home, three hundred and seventy five envelopes have disgorged nearly four hundred QSL cards, $155 US, three hundred and forty SAE, five hundred and ten IRCs, some SASEs and mint foreign stamps of various countries. He's opened a Pandora's Box.

Better have some QSL cards printed pretty quick or the Fraud Squad will be around asking questions. Now — what kind of card to print — lets have a look at some good DX cards already received from overseas. Now that's a good one from VPg — looks a little like where the operation took place and in the holiday slides are one or two that could be used for a good card picture. Now for some prices to get the cards printed. Wow — $875 for five thousand cards. Suppose that will have to do and after all I've already collected $350 from incoming mail so far. That will surely be enough cards to answer all incoming mail.

Six months later — with the incoming mail drying up, the intrepid holiday DXer begins to count the cost. Practically all his spare time has been taken up with mail opening, sorting, checking contacts in the log, writing return QSLs, enveloping and posting. The local postal clerk tends to shun him now if possible — wonder why. After all he only had to count and stamp some IRCs whenever there was any posting to be done, then occasionally he did have to look up the Postal Guide to see if a certain place existed and how much it cost to airmail a letter there. Apparently no one else in the district uses IRCs and no one sends out so many confirmations direct. It's so difficult trying to explain about confirming contacts by mail as the postal clerk thinks if I've spoken to them, what's all the mail about. Things that cannot be talked about on the radio?? Weird!! Oh well — that's the last card posted off.

During the last six months, there was only about sixty QSLs received via the bureau. That's good, now to sum up our work to date.

Credit —	Envelopes received	4800
	QSLs received	5000
	SAE received	4300
	IRC at 40 cents each	$6100
	$1 US	$2000
	Total	$8100
Debit —	Postage	$2880
	Print Cards & Envelopes	$ 900
	Total	$3780
Balance —		$4320

Now everyone will say the holiday paid for itself and at the moment this does look to be so. However, time passes and at the following WIA meetings the QSL officer keeps handing over thick wads of cards from the incoming bureau. Heck! with answering the direct cards our friend had forgotten about the bureau. So another printing is necessary but this time it costs $895 for five thousand cards which should be enough to satisfy the demand.

Twelve months after that glorious holiday on the beautiful tropical isle the tide of bureau cards is almost as strong as the direct QSLs were in those first hectic months of being home. By now there have been five thousand cards sent out at 2 cents a card and the kitty is looking quite different to the early days. Bureau operation and card printing have reduced the profit to $3000. Still that is quite a handsome profit for doing work that was enjoyed — or was it?

The suntan soon disappeared because weekends were spent answering QSLs and his middle expanded because of lack of exercise. His mum noticed that seldom, if ever, was her favourite evening TV programme jittering as Bob was not transmitting anymore. She had heard him muttering to himself a lot lately too. Words like — never again — all those blasted cards — thirty seconds contact causes five minutes paper work — I'll get a manager next time.

Note — All characters are completely fictitious and have no reference to any living persons or DX stations.

AR

RUSSIAN FOR ENGLISH SPEAKING RADIO AMATEURS

Ian Foster, VK3ST
Box 77, Bairnsdale, Vic 3875

Russian shown in this article has not been spelt correctly and this has been done deliberately in order that the pronunciation could be taken literally straight from the text. The other reason why this has been done is that when consulting the various RUSSIAN/ENGLISH guides that are available, it has been found that if the Russian phrases in general as printed in these books are not understood by European Russians, they were perhaps intended for confusion rather than assistance.

The following phrases will be sufficient to at least allow a very simple contact to be realised and it is certainly not intended as a guide for the experienced linguist or Russian language expert.

It should be remembered that if a contact is to be attempted, one must speak slowly as the accents are worlds apart let alone the languages and in general I have found nearly all Russian speaking people only too willing to assist in respect of language difficulties, provided of course, that they know what is required of them. Remember, most of the English speaking Russians have a limited English vocabulary and also have difficulty in understanding if you speak too fast.

From January to May 1983, I have had over 400 contacts with stations in European Russia and at least 200 of those contacts have been all in the Russian language. I might add that I only started to learn the Russian required to establish contact in January and for a person who was a very poor French scholar many years ago in school, I have found it to be a very rewarding and challenging exercise.

The Russian alphabet is quite different to our own as are various vowel groups and any of the phrases shown in this article are shown purely for pronunciation. Any attempt to write Russian, using the methods shown here, to a Russian speaking person will, quite probably, send the recipient into peals of uncontrollable laughter. If you would like to write in Russian, then I would suggest a more serious look at appropriate courses on the subject as this is not the intent of this article.

FIRSTLY, THE RUSSIAN PHONETIC ALPHABET

A — ÁNNA	M — MARÍA
B — BORÍS	N — NICKOLÍ
C — CENTRÁLI	P — PARVÍL
D — DÍMA	Q — SHÓOGAR*
E — ELÉNA	R — ROMÁN
F — FÉEDER	S — SÉGAY
G — GRIGÓRY	T — TAKYÁNA
H — HARITON	U — OOLYÁRNA
I — IVÁN	V — ZOOK
J — IVÁN KROSKY	W — VASÍLY
K — KÓSTYA	X — ZNÁK
L — LÚBA	Y — EEGRÉK
	Z — ZÉENA

˙ Accent
* Liable to be confused with "Sugar" for S

RUSSIAN NUMBERS

0 — NULL	7 — SYÉ-EM
1 — ODÍN	8 — VÓSYEM
2 — DVA	9 — DYÉVIT
3 — TREE	10 — DYÉSIT
4 — CHITÉRYA	15 — PITNÁTSAT
5 — PYAT	20 — DVÁTSAT
6 — SHEST	30 — TRÍDSAT
	100 — STO

73 — SYE-ÉM DYÉSIT TREE

The following is a typical very short QSO between VK3ST and UK9ACP. The English will be first to give the guide followed by the "Russian" to be spoken. For the sake of brevity, only the transmission from VK3ST is given and responses will be able to be gauged with practice and useage.

QRZ . . . Who is calling me?
KTO MENYÁ PRIZIVÁYET?

("QRZ" works just as well)

Thankyou, UK9ACP this is VK3ST
SPASÍBA UNIFORM KILO DYÉVIT ALPHA CHARLIE POPPA YA VICTOR KILO TREE SIERRA TANGO

(International Phonetics Preferred)

Good morning — DÓBRI ÓOTRA
Good afternoon — DÓBRI DÉEN
Good evening — DÓBRI VYÉCHER

My name is Ian
MANYA ZOVÓOT IAN (spell phonetically)
(INDIA ALPHA NOVEMBER)

Your signals are 5 9
VASH SIGNÁL PYAT DYÉVIT

My city/town is .....
MOY GÓOROD .....

My transceiver is a Drake TR7 and my antenna is a four element yagi
MOY TRÁNSCEIVER, DRAKE TAKYÁNA ROMÁN SYÉ-EM, MOY ANTÉNNA CHITÉRYE ELEMÉNTA YÁGI

UK9ACP this is VK3ST over
OOLYÁRNA KÓSTYA DYÉVIT ÁNNA CENTRÁLI PARVÍL YA ZOOK KÓSTYA TREE SÉGAY TAKYÁNA, PRIÓN

Listen to the reply and with care you should be able to piece together the response using the information already given.

UK9ACP this is VK3ST, thankyou my friend Gene, excellent
OOLYÁRNA KÓSTYA DYÉVIT ÁNNA CENTRÁLI PARVÍL YA ZOOK KÓSTYA TREE SÉGAY TAKYÁNA. SPASÍBA MY DRÓOK GENE, PRIKRÁSNA

Thankyou for the signals (report) 5 9
SPASÍBA ZA SIGNÁL PYAT DYÉVIT

Thankyou my friend Gene for the beaut contact
MOY DROOK GENE, SPASÍBA ZA HOR-ÓSIA SE-ÁZ

I will QSL 100% via the bureau to Moscow
QSL STO PROSYÉNTOV BUREAU MOSKVA

Until we meet again on the air, good luck to you my friend
DO-NÓV-OY VSTRÉTCHIE VA VÉERIE, VSYEVÓ VAM DÓBROVÓ MOY DROOK

SYÉ-EM DYÉSIT TREE

UK9ACP this is VK3ST. Goodbye, thankyou (very much)
OOLYÁRNA KÓSTYA DYÉVIT ÁNNA CENTRÁLI PARVÍL YA ZOOK KÓSTYA TREE SÉGAY TAKYÁNA. DOS-VID-ÁNIA. SPASÍBA. (BOLSHYÓYE)

The above should be enough to get you through a very basic QSO and remember that most Russians speak a limited amount of English so don't be afraid to change language if you lose track, can't understand or want to know/respond to some other comment. Some other useful phrases that may help are:

How do you say in Russian the word (or phrase) "EAST"

KAK BÓODET PARÚSKI "EAST" (last work is english for translation or KAK PA-RÚSSKI SLOV "EAST"

Good
HOR-OSHA-YÓ (HOROSHÓ)

I am sorry
YA Ó-CHEN SOZ-OLÁYOO

What is your callsign?
KAKOYI VASH POZNÍVOY?

Please
PAZHÁOOSTA

Please give me your name? (QTH)
PAZHÁOOSTA DAĪTYE SNÓWA VASH ĪMYA? (GÓOROD)

Repeat your name? (QTH)
POV-TOR-ĪTA SNÓWA VASH ĪMYA? (GÓOROD)

Thankyou very much my friend.
BOLSHÓYE SPASĪBA MOY DROOK

I hope to see you again.
YA NAD-E-YÓOS RAZ-GOV-ÁRIVAT SVÁMI SNÓWA

I — YA ... Yes — DA ... No — NIET ... Friends (plural) — DROOZ-YÁ ... If speaking to a lady, one should say "MOYÁ PADRÓOGA" My friend

The temperature is 20 degrees (above freezing)
DVÁTSAD GRA-DÚSAF (TIPLÁ) or TEMPERATOÓRA DVÁDSAT GRADOÓSOF

Today is good weather
SIVÓD-NYA HOR-ÓSHO-YA PA-GÓ-DA

Today it is
SIVÓD-NYA (Warm) TIPLO ... (Very hot) ÓCHEN ZHÁRKO ... (Hot) ZSÁRKO ... (Cool) PRA-KHLÁDNA ... (Cold) KHOLÓDNA

Please speak slowly
PASZÁLSTA GAVA-RĪ-TYE M-YED-LYÉNNA

I do not understand you
YA NYE PANI-MÁYU VAS

To those of you who are willing to give it a go, I am sure that you will find that contrary to popular belief, learning to use a language can be very satisfying and will certainly put some value on those QSL cards that are received via Box 88 in Moscow.

In conclusion, I would like to thank Gene Shcumat, UA9AAP and the many other Russian speaking amateurs who have assisted me during my initial learning period and I feel that a special bond grows and develops between those who try to help others and this should be encouraged wherever and whenever possible. Remember that we are in a specialist area that involves communication and communicating. Let us get out there and communicate and learn from one another.

EDITOR'S NOTE

Thanks are due to R Hancock, VK5AFZ, for checking and, where necessary, correcting a few phonetic equivalents and also for the following notes.

Use of the Russian phonetic alphabet is not really necessary, as all Russian amateurs are familar with the International Phonetic Alphabet. However, the Russian system is used to a greater extent between Russians themselves so it is handy to know if you want to "eavesdrop" on USSR stations. Personally I would advocate that everyone uses the International Phonetics on all occasions for the sake of uniformity and to avoid confusion.

Also, a reminder that VK stations conducting a QSO in a foreign language are required to identify their call letters in English at the appropriate intervals. Identification in the foreign language only is not sufficient.

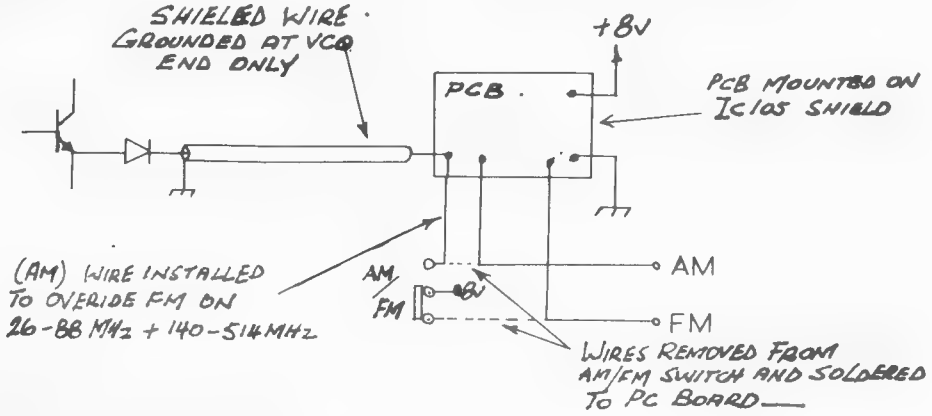
AR

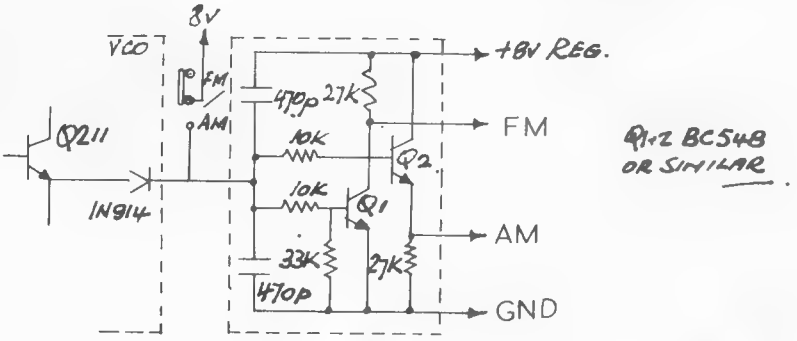
SERVICE BULLETIN or do your own repairs??

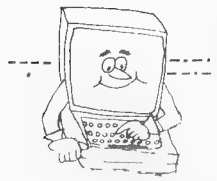
• MODIFICATION TO ALLOW AUTOMATIC MODE SWITCHING

This modification causes the SX200N to automatically switch to AM mode when any Airband frequency in the 108 to 139.995 MHz frequency range (band A4) is programmed into it. Additionally, the front panel mounted AM/FM switch allows manual AM override on any of the other bands (i.e. A1, 2, 3, 5, & 6). So that the manual AM/FM selection may be used on all bands except A4 where the user is restricted to operation in the AM mode only.

This information has been kindly supplied by GFS Electronic Imports, 15 McKeon Road, Mitcham 3132.


SHIELED WIRE · GROUNDED AT VCO END ONLY
+8V
PCB
PCB MOUNTED ON IC 10S SHIELD
(AM) WIRE INSTALLED TO OVERIDE FM ON 26-88 MHz + 140-514 MHz
AM/FM
8V
AM
FM
WIRES REMOVED FROM AM/FM SWITCH AND SOLDERED TO PC BOARD





MORSE CODE AND YOUR COMPUTER

Alan MacLean, VK3ASL
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About two years ago, I became interested in computers and bought myself a TRS-80. There were a number of other computers available and a wide range of prices. Knowing nothing about any of them, I settled for the TRS-80 on the recommendation of a friend who had one.

I learned to programme it by following the excellent instructional manual which came with it, but I found it helped to study a couple of other books on basic programming which were available from the Tandy Store.

I knew computers could be used for sending and receiving Morse code and RTTY but had no idea how to write a programme to do this and enquired about getting a programme already written. The programmes advertised by various software suppliers seemed to be limited to calculating the lengths of elements for antennas or for keeping a log book. There were hardware and software packages that could be bought, but these seemed to be far too expensive.

Finally, I decided to write a programme myself. I looked for guidance in various magazine articles, but the authors were theorising with algorithms about how it could be done or giving programmes in machine language which I didn't understand. I'm strictly a self-taught Basic only programmer.

There seemed to be three problems:
— how to generate Morse
— how to decode Morse
— how to connect (interface) the computer to the rig.

I found out that, without some more expensive hardware, the TRS-80 could only communicate with the outside world through its connections to the cassette tape recorder used for loading and storing programmes. One of the connections is to the remote plug of the recorder and its function is to turn on the recorder's motor during recording or play-back. I set to work to write a programme that would turn on the motor for the length of a dit, turn it off for the same time, then turn it back on for the length of a dah. By connecting the remote plug to an audio oscillator instead of the tape recorder, that would have sent the letter A.

The instruction "OUT 255,04" turns on the motor and "OUT 255,0" turns it off again. A delay loop is needed to determine how long the motor is on or off. As we are not using the motor, it's really a matter of how long the cassette relay in the computer is turned on or off, which governs how long the oscillator is on or off.

I found by experimenting that the Morse speed in WMP when divided into 400 gave the number of loops required for a delay equal to one dit at that speed. I use the expression "X1=(400/B1)", where "X1" is the number of loops and "B1" is the number of WPM. Thus the instruction needed to send a dit is: 10 OUT 255,04: FOR I=1 TO X1: NEXT I: OUT 255,0. There is a need to send a dit length space after each dit or dah, so the next instruction would be. 20 FOR I=1 TO X1: NEXT I.

Because a dah is three times as long as a dit, the loop needs to be of a length equal to X1*3 (X1 multiplied by 3 for those who don't read Basic). So a dah followed by a space would be sent by: 30 OUT 255,04: FOR I=1 TO X1*3: NEXT I: OUT 255,0: FOR I=1 TO X1: NEXT I. If we put in another line: 40 GOTO 10 we have written a programme that will keep on sending DIT DAH until you switch it off.

If we put a space the length of 3 DITS after the DAH, the letter A will be sent continuously, so we'll amend line 40 to read: 40 FOR I=1 TO X1*3: NEXT I: GO TO 10.

The next thing is to construct a piece of hardware, so that you can hear the Morse sent. For this you will need a small relay, a battery to run it, an audio oscillator module and a separate battery if it happens to use a different voltage from the relay. A small speaker will allow you to hear the oscillator.

Make up the hardware, plug in the remote plug, and enter the programme. If you have a TRS-80 you should now be able to hear continuous A's. If you don't have a TRS-80, but your computer has connections for an external tape recorder, it may work if you find out the number of its cassette port and substitute that for the number 255 in the programme. If your computer doesn't have such a connection, I'm afraid I don't know what you can do.

Being able to send a lot of A's will not be of much practical use, so a bit more programming is needed to send all the other letters of the alphabet, as well as figures and punctuation.

I might say at this stage that since writing my programme, I have learned of several other ways to generate Morse with a programme in Basic, and know that there are a number of machine language programmes that will do it. However, this one is the only one that I have tried, so I'll stick to what I know.

The next step is to write sub-routines for sending one, two and three dits, and one, two and three dahs. Any letter, figure or symbol will be made up of one or more of these. Then we can input a letter to the computer by typing it on the keyboard, and have the computer say to itself "if this is an A, then GOSUB for one dit and GOSUB for one dah and return for the next letter". For the letter C it would be GOSUB for a dah then a dit then a dah and another dit. The input of the letter is achieved by the INKEY$ function of the computer which strobes the keyboard to find out which letter has been pressed, then calls up the sub-routine for generating the dits and dahs for that letter.

If you have a look at the programme listing, you will see that line 120 is the INKEY$ function which determines which key has been pressed. Line 130 converts that letter to its ASCII equivalent (that is — a number which means a letter).

Lines 130 and 131 convert the ASCII numbers so that A to Z equals 1 to 26 and 0 to 9 equals 27 to 36.

Line 137 causes the computer to go to one of the lines between 310 and 650 which means the appropriate letter or figure. That line then calls up the sub-routine that generates the Morse for the letter or figure. Much the same thing happens with lines 170 to 270, which generate some useful phrases and punctuation, etc, and line 180 which sends eight dits to indicate an error. The other parts of the programme do things like sending pre-recorded messages, and if you've been able to follow the explanation so far, you'll have no difficulty in working them out.

The next part of the programme is a bit more difficult. This is the part that decodes Morse. The following short version of the decode portion, which has explanatory statements may help you to understand it. Even though I wrote it, I have to think pretty hard myself to work out what it is doing. I mentioned earlier that there are other programmes available to send Morse. As well, there are programmes you can buy to decode Morse. The ones I have seen are either in machine language so I don't know what is happening or they are in Basic and don't work. At least, I haven't been able to make them work — and I believe that I'm not alone in this. Anyway, mine does work — if the Morse comes from a code oscillator — but I have problems if the Morse comes off the air. To some extent this is due to static and random noise, but I think that to a large extent, it is due to badly keyed Morse.

Anyway programme 1 is a short listing of the decode section of the programme which has Rem statements which may help you to understand what it is doing:

The programme senses whether there is a signal at the input port number 255, which is the cassette input to the computer. If the value of that port is 255 then there is a signal and if there is no signal, the value is 127. I don't really know why, it just works that way. Then the time that the signal is there is measured to find out if the signal is long or short — that is — whether it is a dit or a dah. In between dits and dahs the spaces are measured to find out

```
15 INPUT "SPEED IN W.P.M.";W: REM** OMIT WHEN MERGED WITH SEND ROUTINE, WHICH HA
S A SIMILAR INPUT
16 Z=1744/48*1/W: REM** Z=LENGTH OF ONE DIT. LINES 30+31 & 40+41 LOOP 1744 TIMES
 IN A MINUTE. THE LENGTH OF ONE WORD IS EQUAL TO 48 DITS AT 1 W.P.M.  W IS THE N
UMBER OF W.P.M.
21 A$=INKEY$:IFA$="$"GOTO 15 REM** HIT $ TO CHANGE SPEED.
22 REM IF A$="#" GOTO   ** START OF 'SEND' ROUTINE
23 V=V+1:IF U=1 AND V>=Z*5 THEN PRINT CHR$(32)::U=0: REM**PRINTS A SPACE AT THE
END OF A WORD.
25 IF INP(255)=127 THEN 21 ELSE 40 REM**LOOKS TO SEE IF THERE IS A CHANGE OF SPE
ED OR RETURN TO SEND ROUTINE.
30 V=0:X=0:Y=Y+1::IFY=>Z*3 THEN 101 REM** IF SPACE IS EQUAL TO 3 DITS OR MORE, L
ETTER IS COMPLETE, SO PRINT IT.
31 IFINP(255)=127 GOTO30 REM **MEASURES TIME KEY IS UP.
40 OUT255,1:::::::::::::::::::::::::X=X+1
41 IF INP(255)=255GOTO40 REM **MEASURES TIME KEY IS DOWN. COLONS MAKE LOOP TIME
OF 40+41 SAME AS 30+31 - 1744 PER MINUTE.
60 IF X>=ZAND X<Z*3 THEN T$="."
70 IF X>=Z*3 THEN T$="-"
90 W$=W$+T$:GOTO30 REM** ACCUMULATES THE DITS AND DAHS UNTIL A LETTER IS COMPLET
E.
101 IF W$=".-"THEN PRINT"A"::GOTO150
102 IF W$="-..."THEN PRINT"B"::GOTO150
103 IF W$="-.-."THEN PRINT"C"::GOTO150
104 REM LINES 104-140 COVER D-Z AND 1-0
141 IF W$="........."THEN PRINT"ERROR"::GOTO150
150 W$="":U=1
160 Y=0:GOTO21 REM** GOES TO LOOK FOR THE NEXT LETTER.
```

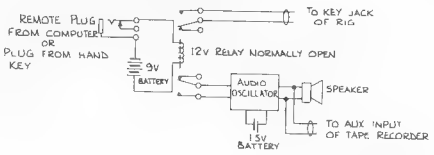
PROGRAMME 1

whether they are spaces between symbols (one dit length) letters (one dah length) or words (five dit lengths).

If you try the programme and it doesn't seem to work — particularly if you get a lot of E's, I's or S's — change the value of W a little at a time until it comes good. However, unless you have a source of good clear Morse without any static or random noise, you'll get some funny results. The receive programme works quite well on Morse generated by the send portion of the programme and recorded on tape for later playback.

That brings us to the next point of how you get the received Morse into the computer so that you can decode it.

Morse recorded on tape can just be put in through the normal cassette connection to the computer. To hook up a rig, it would probably only be necessary to take a lead from the phone jack or extension speaker socket, or even by a tap across the voice coil



A small piece of hardware.

of the speaker, so long as the audio level is the same as it would be if the audio were coming from the cassette recorder. To be on the safe side, I feed the receiver audio into the Aux socket of the tape recorder, which is in the Record mode and has the Remote plug inserted so that the tape won't run. It's best to use the very start of the tape, where there is nothing recorded. That way, the computer is looking into something it is used to.

To record Morse, simply connect the voice coil of the speaker used with the audio oscillator into the Aux socket of the tape recorder.

To connect the computer to the rig to transmit Morse on the air, connect the spare set of contacts (the normally open ones) on the relay in the piece of hardware mentioned earlier to the key jack of your rig.

No doubt, the receive portion of the programme would work better if it was in machine language, but I don't know how to do that. You may think that the send portion is a bit cumbersome, with all those GOSUB's. However, it is written and it works. If I were doing it again I would do it differently, but isn't that the same with any project we attempt?

If you would like a copy of the programme on cassette tape, I'll be glad to supply it — just send me a Jiffy bag and enclose a cassette tape, your name and address and return postage.

AR

Computer Programme for Morse Code next page . . .

QSP

OLYMPIC GAMES 1984

Amateurs in California with the numeral 6 in their call sign will have the opportunity to commemorate the 23rd Olympiad in 1984 during the months of July and August.

The FCC will permit the amateurs to substitute the number 6 with either "23" for the 23rd Olympiad or "84" on a voluntary basis.

from The ARRL Letter, Vol 2 No 20.

AR

NEW AWARD

The "Lower Eyre Peninsula Amateur Radio Club Inc", based at Port Lincoln, on Lower Eyre Peninsula, will have the official opening of it's new club facilities on Sunday, 29th January, 1984.

To mark the occasion, a first ever Eyre Peninsula Award will be issued with a special endorsement for opening day. The official opening of the club rooms and the launching of the award will coincide with the city's annual "Tunarama Festival".

AR

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10 'TO CHANGE CALL SIGN EDIT LINES 70, 1010 AND 1060
20 CLS
30 PRINT"                              ***MORSE CODE***"'1/4/83.
35 'WRITTEN BY ALAN MACLEAN, VK3ASL, QTHR.
40 INPUT"INSERT SPEED REQUIRED IN WORDS PER MINUTE";B1
50 X1=(400/B1)
60 PRINT"TUNE        !.   SEND      #.   CHANGE SPEED   $.   RECEIVE   %.
70 PRINT"COMMENCE    &.   CALL CQ    '.   FROM           (.   VK3ASL    ).
80 PRINT"END OVER    *.   BREAK      =.   END MESSAGE    @.   ERROR     +.
90 PRINT"TYPE ↑ TO SEND MESSAGE ENTERED IN LINES 910 AND 960"
110 P1=0:K=0:J=0:Q1=0:J1=0:R1=0
120 B$=INKEY$:IFB$=""THEN120
130 A1=ASC(B$):IFA1>64ANDA1<91THEN A1=A1-64:GOTO137
131 IFA1>47ANDA1<58THENA1=A1-21:GOTO137
132 IF A1=32 THEN GOTO 300 ELSE 139
137 ON A1 GOTO 310,320,330,340,350,360,370,380,390,400,410,420,430,440,450,460,4
70,480,490,500,510,520,530,540,550,560,565,570,580,590,600,610,620,630,640,650
139 IF B$="!"GOSUB800:GOTO110
140 IF B$="#"THENPRINTCHR$(10)"**SENDING**":GOTO110
150 IF B$="$"GOTO20
160 IFB$="%"GOTO1120
170 IFB$="&"GOSUB740:GOSUB710:GOSUB740:GOSUB710:GOSUB740:GOTO670
180 IFB$="'"THENQ1=1:GOTO1000
190 IFB$="("GOSUB740:GOSUB710:GOSUB710:GOSUB780:GOSUB710:GOTO670
200 IFB$=")"THEN R1=1:GOTO1050
210 IFB$="*"GOSUB710:GOSUB740:GOSUB710:GOSUB740:GOSUB710:GOTO670
220 IFB$="="GOSUB740:GOSUB730:GOSUB740:GOTO670
230 IFB$="@"GOSUB730:GOSUB740:GOSUB710:GOSUB740:GOTO670
240 IFB$=","GOSUB750:GOSUB720:GOSUB750:GOTO670
250 IFB$="."GOSUB710:GOSUB740:GOSUB710:GOSUB740:GOSUB710:GOSUB740:GOTO670
260 IFB$="?"GOSUB720:GOSUB750:GOSUB720:GOTO670
270 IFB$="/"GOSUB740:GOSUB720:GOSUB740:GOSUB710:GOTO670
280 IFB$="+"GOSUB710:GOSUB780:GOSUB710:GOSUB780:GOSUB710:GOSUB780:GOSUB710:GOTO1
700
290 IFB$="↑"THENP1=1:GOTO900
300 GOSUB775:GOTO670
310 GOSUB710:GOSUB740:GOTO670''A
320 GOSUB740:GOSUB730:GOTO670''B
330 GOSUB740:GOSUB710:GOSUB740:GOSUB710:GOTO670''C
340 GOSUB740:GOSUB720:GOTO670''D
350 GOSUB710:GOTO670''E
360 GOSUB720:GOSUB740:GOSUB710:GOTO670''F
370 GOSUB750:GOSUB710:GOTO670''G
380 GOSUB710:GOSUB730:GOTO670''H
390 GOSUB720:GOTO670''I
400 GOSUB710:GOSUB760:GOTO670''J
410 GOSUB740:GOSUB710:GOSUB740:GOTO670''K
420 GOSUB710:GOSUB740:GOSUB720:GOTO670''L
430 GOSUB750:GOTO670''M
440 GOSUB740:GOSUB710:GOTO670''N
450 GOSUB760:GOTO670''O
460 GOSUB710:GOSUB750:GOSUB710:GOTO670''P
470 GOSUB750:GOSUB710:GOSUB740:GOTO670''Q
480 GOSUB710:GOSUB740:GOSUB710:GOTO670''R
490 GOSUB730:GOTO670''S
500 GOSUB740:GOTO670''T
510 GOSUB720:GOSUB740:GOTO670''U
520 GOSUB730:GOSUB740:GOTO670''V
530 GOSUB710:GOSUB750:GOTO670''W
540 GOSUB740:GOSUB720:GOSUB740:GOTO670''X
550 GOSUB740:GOSUB710:GOSUB750:GOTO670''Y
560 GOSUB750:GOSUB720:GOTO670''Z
565 GOSUB760:GOSUB750:GOTO670''0
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570 GOSUB710:GOSUB740:GOSUB760:GOTO670''1
580 GOSUB720:GOSUB760:GOTO670''2
590 GOSUB730:GOSUB750:GOTO670''3
600 GOSUB730:GOSUB710:GOSUB740:GOTO670''4
610 GOSUB730:GOSUB720:GOTO670''5
620 GOSUB740:GOSUB730:GOSUB710:GOTO670''6
630 GOSUB750:GOSUB730:GOTO670''7
640 GOSUB760:GOSUB720:GOTO670''8
650 GOSUB760:GOSUB740:GOSUB710:GOTO670''9
670 GOSUB775:PRINTB$;
680 IF P1=1 THEN GOTO 900
690 IF Q1=1 THEN GOTO1000
695 IF R1=1 THEN GOTO1050
700 GOTO110
710 OUT255,04:GOSUB770:OUT255,0:GOSUB770:RETURN''DIT
720 OUT255,04:GOSUB770:OUT255,0:GOSUB770:OUT255,04:GOSUB770:OUT255,0:GOSUB770:RE
TURN:''2 DITS
730 OUT255,04:GOSUB770:OUT255,0:GOSUB770:OUT255,04:GOSUB770:OUT255,0:GOSUB770:OU
T255,04:GOSUB770:OUT255,0:GOSUB770:RETURN''3DITS
740 OUT255,04:GOSUB780:OUT255,0:GOSUB770:RETURN''DAH
750 OUT255,04:GOSUB780:OUT255,0:GOSUB770:OUT255,04:GOSUB780:OUT255,0:GOSUB770:RE
TURN:''2 DAHS
760 OUT255,04:GOSUB760:OUT255,0:GOSUB770:OUT255,04:GOSUB780:OUT255,0:GOSUB770:OU
T255,04:GOSUB780:OUT255,0:GOSUB770:RETURN''3 DAHS
770 FORA1=1TOX1:NEXT:RETURN''DIT LENGTH
775 FORA1=1TOX1*2:NEXT:RETURN''SYMBOL AND WORD SPACE
780 FORA1=1TOX1*3:NEXT:RETURN''DAH LENGTH
800 OUT255,04:FORA1=1TO3000:NEXT:OUT255,0:RETURN''KEY DOWN 6 SECS
900 J=J+1
910 C$="A MESSAGE OF 255 CHARACTERS MAY BE INSERTED HERE."
920 IFJ>LEN(C$) THEN 950
930 B$=MID$(C$,J,1)
940 GOTO130
950 K=K+1
960 D$=" AND ANOTHER ONE HERE."
970 IF K>LEN(D$)THEN 110
980 B$=MID$(D$,K,1)
990 GOTO 130
1000 J1=J1+1
1010 J1$="CQ CQ CQ DE VK3ASL VK3ASL VK3ASL + K"
1020 IF J1>LEN(J1$) THEN 110
1030 B$=MID$(J1$,J1,1)
1040 GOTO130
1050 J1=J1+1
1060 L1$="VK3ASL"
1070 IFJ1>LEN(L1$)THEN 110
1080 B$=MID$(L1$,J1,1)
1090 GOTO130
1120 PRINTCHR$(10)"**RECEIVING**"
1130 Z=1744/48*1/B1
1150 A$=INKEY$:IFA$="$" GOTO20
1160 IF A$="#"THEN PRINTCHR$(10)"**SENDING**":GOTO110
1170 V=V+1:IF U=1 AND V>=Z*5 THENPRINTCHR$(32)::U=0
1180 IF INP(255)=127 THEN1150 ELSE1210
1190 V=0:X=0:Y=Y+1::IFY>Z*3 THEN1260
1200 IFINP(255)=127 GOTO1190
1210 OUT255,1:::::::::::::::::::::X=X+1
1220 IF INP(255)=255GOTO1210
1230 IF X>=ZAND X<Z*3 THENT$="."
1240 IF X>=Z*3 THENT$="-"
1250 W$=W$+T$:GOTO1190
1260 IF W$=".-"THENPRINT"A";:GOTO1630
1270 IF W$="-..."THENPRINT"B";:GOTO1630
1280 IF W$="-.-."THENPRINT"C";:GOTO1630
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1290 IF W$="-.."THENPRINT"D";:GOTO1630
1300 IF W$="."THENPRINT"E";:GOTO1630
1310 IF W$="..-."THENPRINT"F";:GOTO1630
1320 IF W$="--."THENPRINT"G";:GOTO1630
1330 IF W$="...."THENPRINT"H";:GOTO1630
1340 IF W$=".."THENPRINT"I";:GOTO1630
1350 IF W$=".---"THENPRINT"J";:GOTO1630
1360 IF W$="-.-"THENPRINT"K";:GOTO1630
1370 IF W$=".-.."THENPRINT"L";:GOTO1630
1380 IF W$="--"THENPRINT"M";:GOTO1630
1390 IF W$="-."THENPRINT"N";:GOTO1630
1400 IF W$="---"THENPRINT"O";:GOTO1630
1410 IF W$=".--."THENPRINT"P";:GOTO1630
1420 IF W$="--.-"THENPRINT"Q";:GOTO1630
1430 IF W$=".-."THENPRINT"R";:GOTO1630
1440 IF W$="..."THENPRINT"S";:GOTO1630
1450 IF W$="-"THENPRINT"T";:GOTO1630
1460 IF W$="..-"THENPRINT"U";:GOTO1630
1470 IF W$="...-"THENPRINT"V";:GOTO1630
1480 IF W$=".--"THENPRINT"W";:GOTO1630
1490 IF W$="-..-"THENPRINT"X";:GOTO1630
1500 IF W$="-.--"THENPRINT"Y";:GOTO1630
1510 IF W$="--.."THENPRINT"Z";:GOTO1630
1520 IF W$=".----"THENPRINT"1";:GOTO1630
1530 IF W$="..---"THENPRINT"2";:GOTO1630
1540 IF W$="...--"THENPRINT"3";:GOTO1630
1550 IF W$="....-"THENPRINT"4";:GOTO1630
1560 IF W$="....."THENPRINT"5";:GOTO1630
1570 IF W$="-...."THENPRINT"6";:GOTO1630
1580 IF W$="--..."THENPRINT"7";:GOTO1630
1590 IF W$="---.."THENPRINT"8";:GOTO1630
1600 IF W$="----."THENPRINT"9";:GOTO1630
1610 IF W$="-----"THENPRINT"0";:GOTO1630
1620 IF W$="........"THENPRINT"ERROR";:GOTO1630
1630 W$="":U=1
1640 Y=0:GOTO1150
1700 GOSUB780:GOSUB710:GOSUB780:GOSUB710:GOSUB780:GOSUB710:GOSUB780:GOSUB710:GOT
0670
```

Bill Blitheringtwit & the BLACKOUT . . .

Ted Holmes VK3DEH
20 Edmond Street, Parkdale, Vic 3195

Bill Blitheringtwit was thoroughly fed up with the whole mobile situation. It had been nothing but disaster from beginning to end, resulting in a mutilated car and a wrecked antenna, not to mention a microphone trampled beyond redemption. He decided he had had enough of being banned from the house by a determined better half and that it was time he resumed activities inside. Afetr all, it had been weeks since the affair of the ruined antenna and a new one had been erected by then by a tradesman.

A tradesman! Merciful heavens! Couldn't Bill have done that sort of thing himself? Amateur Radio was about doing things yourself and his wife hadn't let him. Instead she had insisted on having the job done "properly" (as she put it). Bill still smarted about this. There the thing stood, shiny and new, right on top of the chimney and Bill still harboured a smouldering resentment about the cost. He could have done a better job himself for half the price!

He wandered into his long neglected shack and stared at his gear. It was covered with a fine film of dust and quite a few cobwebs. This wasn't because of his enforced absence: it always looked like that. Bill felt something stirring within him, a strange longing tinged with frustration and a certain amount of trepidation. There was his ancient Star, the Rolls Royce of rigs, neglected, lonely and calling for him.

Suddenly he sat at the table. Dare he? Why not? After all, Amateur Radio was about doing your thing and why shouldn't he do his? Damn it! A man can stand just so much! He turned on the power supply It was silent and did not emit the loud hum he was used to. Strange! The plug was in and switched on. He gave the cord a yank and at this stage the smell began. It was a smell like an old incinerator, mixed with burning rubber, together with dust. He wiggled the power cord about a bit and heard odd crackling sounds.

Then the smoke started. Thick, oily and revolting. It camethrough the holes in the top of the power supply box and got steadily thicker.

This caused Bill some alarm. The device had never done this before, even though he could recall hearing unusual pops and squeaks from it last time he had used it. He wasn't sure what to do. It didn't occur to him to switch off the power supply at the socket. Instead he suddenly remembered he had a glass of beer with him. Instantly he tossed the contents of the glass over the supply, so it would fall through the holes and put the fire out.

There was a loud bang as the house fuses blew and Bill's wife, happily watching TV with her brand new antenna, was dramatically plunged into darkness.

ABBREVIATIONS IN COMMON USE

Magazine articles and books dealing with almost any aspect of modern electronics will be found to contain quite a few acronyms and other abbreviations for frequently-used terms. Once the abbreviations are known, communication often becomes easier and more efficient than if they were not used; but until the abbreviations are known, it can be very difficult. Below you will find most of the abbreviations in common use, with their meanings briefly explained. Used as a reference, this should allow you to follow most articles and books. Specialised or less frequently used abbreviations should usually be defined in the articles in which they appear, either in the text at the first appearance, or in a separate glossary. For more complete explanations of meanings than are given here, refer to standard texts.

A — Ampere (Amp)
AC, ac — Alternating current
AF, af — Audio frequency
agc — Automatic gain control
AH — Hamads — at home or private number. After hours
ALC, alc — Automatic level control
AM, am — Amplitude modulation
AMSAT — The Radio Amateur Satellite Corporation
anl — Automatic noise limiter
AOCP — Amateur Operator's Certificate of Proficiency
AR, ar (s) — Amateur radio (service), Amateur Radio magazine
ASCII — American Standard Code for Information Interchange
ATV — Amateur television
avc — Automatic volume control
balun — Balanced to unbalanced transformer
bc — Broadcast
BCD, bcd — Binary coded decimal
bci — Broadcast interference
BFO, bfo — Beat frequency oscillator
bit — Binary digit
Bus — Hamads — business or working hours, office hours
CB — Citizens band
CCIR — ITU — Comite Consultatif International des Radio communications
Ch — Channel
cm — Centimetre
coax — Coaxial cable
CRO — Cathode Ray Oscilloscope
CW, cw — Continuous wave, carrier wave (Morse)
dB — Decibel
DC, dc — Direct current
DX, Dx — Distance (relative)
EHF, ehf — Extra High Frequency (30-300 GHz)
EHT, eht — Extra High Tension (V)
EMC — Electromagnetic Compatibility
EME — Earth-moon-earth (moonbounce)
emf — Electromotive force (V)
ERP, erp — Effective radiated power
F — Farad
FCC — Federal Communications Commission (USA)
FET — Field effect transistor
FM, fm — Frequency modulation ("NB" — narrow band)
fsd — Full scale deflection
FSK — Frequency shift keying (F1 mode)
g — Gram
GDO, gdo — Grid dip oscillator
GHz — Gigahertz (1000 MHz)
h — Hour (24 hour clock), hecto
H — Henry
HF, hf — High frequency (3-30 MHz)
HI, hi — Greetings
HT, ht — High tension (V) (also hV, HV)
Hz — Hertz (cycles per second)
IARU — International Amateur Radio Union
IC, ic — Integrated circuit
IF, if — Intermediate frequency
ITU — International Telecommunications Union
k — Kilo (1000) — e.g. kilo-ohm (1000 ohms)
kg — Kilogram
kHz — Kilohertz (1000 Hz)
km — Kilometre
kV — Kilovolt
kW — Kilowatt
LAOCP — Limited Amateur Operator's Certificate of Proficiency
LC — Inductance capacitance (ratio)
LED — Light emitting diode
LF — Low frequency (30-300 kHz)
LT — Low tension (V)
m — Metre
m — Milli (one thousandth, 0.001)
M — Mega (1,000,000; e.g. 1 MHz 1000 kHz)
u — Micro (0.000001) (one millionth)
uA — 0.000001A (also uF, uH, uV)
mA — Milliampere (0.001A) (also mM, mV, mW)
MCW — Modulated CW (A2 mode)
meg — Usually megohm
MF — Medium frequencies (300-3000 kHz) (medium waves)
MHz — Megahertz (1000 kHz)
mic — Hamads — microphone (also mike)
micromicro — Same as pico, obsolete term
mm — Millimetre
mox — Manual operated transmissions
MUF — Maximum usable frequency
NL — Noise limiter
ns — Nanosecond (0.000000001) (one thousand millionth of a second)
OSC — Oscillator
OSCAR — Orbiting Satellite Carrying Amateur Radio
om — Old man
P, p — Power (p page, pp pages)
p — Pico (0.000000000001) (one million millionth)
PA, pa — Power amplifier
PCB — Printed circuit board
pep — Peak envelope power
pF — Picofarad
Ph — Hamad – telephone No. (STD code first)
Phone — (fone) Telephony-segment, voice transmission
piv — Peak inverse voltage
PM, pm — Pulse modulation, phase modulation
ppi — Plan position indicator (radar)
PSU — Power supply unit
Q — Reactance-resistance ratio, transistor
Q code — CW abbreviations — see Handbook for amateur operators
QTHR — Hamad — address correct in current WIA call book
RF, rf — Radio frequency
RFC, rfc — Radio frequency choke
rfi — Radio frequency interference
RI — Radio Inspector
RMS, rms — Root-mean-square
RST — Readability, strength, tone (reporting signals) (RS only for telephony)
RT — Radio Telephony
RTTY — Radio teletype (teleprinter)
Rx — Hamads — receiver
SAE — Also sase. Self Addressed Stamped Envelope
SHF — Super High Frequencies (3-30 GHz) (microwave regions)
S/N, s/n — Signal to noise (ratio)
SS — Solid State
SSB — Single Sideband (suppressed carrier) — A3J mode
SSTV — Slow Scan Television
Std — Standard
SWL — Short Wave Listener
SWR — Standing Wave Ratio
Tcvr — Hamads – transceiver
TPI — Turns per inch
tptg — Tuned plate tuned grid
TV, tv — Television
TVI, tvi — Television interference
Tx — Hamads — transmitter
UHF — Ultra high frequencies (300-3000 MHz)
V — Volt
VFO, vfo — Variable frequency oscillator
VHF — Very high frequencies (30-300 MHz)
VLF — Very low frequencies (3-30 kHz)
vox — Voice operated transmission
VOX — Voice operated transmission
VU — Volume unit
VXO — Variable crystal oscillator
W — Watt

Ron Cook VK3AFW
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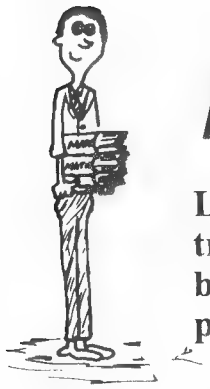


A TRICKY CALCULATION?

Last year this magazine held a competition which involved a one transistor amplifier. Although the usual rule of no correspondence being entered into appllies, I think it might be interesting to look at the problem, which was as follows:

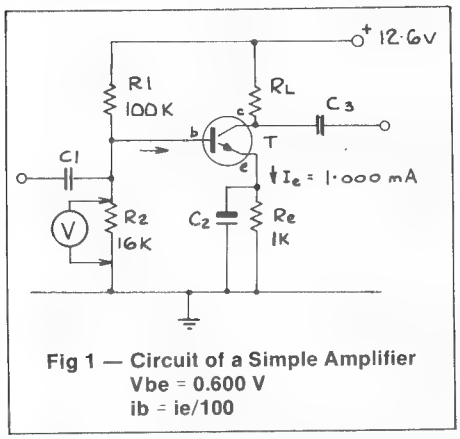


Fig 1 — Circuit of a Simple Amplifier
Vbe = 0.600 V
ib = ie/100

A one transistor amplifier is shown in Fig 1. The question was what readings would be obtained on
(i) A volt meter with a 20 k ohm per volt sensitivity set on the 10 V range.
(ii) A volt meter with a 10 M ohm input resistance.

Firstly let us check the voltage across R2 without the volt meter V.

The current through Re is 1 mA thus the voltage across Re, V = IR
= 1 mA x 1 k ohm
= 1 volt
Now Vbe = 0.600 V

Thus the voltage at the base is 1.600 V positive with respect to ground. This is the same voltage as is across R2.

The current through R2 is
I = V/R
= 1.600/16 000 amp
= 0.1 mA

The base current of the transistor is 1 mA/100 or 0.01 mA.

As both these currents come through R1 the current through R1 = 0.1 + 0.01
= 0.11

The voltage across R1 = IR
= 0.11 mA x 100 k ohm
= 11.000 V

The voltage across R1 and R2 is thus 11.000 + 1.600 volts or 12.6 volts as shown. (Just as well!)

If we put a volt meter across R2 it will draw some current. For the first part of the question, the volt meter has a resistance of 20 k Ω x 10 V = 200 k ohm. This in parallel with R2 becomes less than 16 k ohms. It becomes Rp. The result of two resistors Ra, Rb, in parallel Rp = Ra Rb/(Ra + Rb) or 200 x 16/(200 + 16) k ohms. This works out as 14,814.814 ohms.

Obviously the voltage at the base of the transistor is reduced and consequently as Vbc = 0.600 volts the voltage across Re must reduce hence Ie reduces. Now when Ie reduces so does Ib as Ib = Fe/100.

But Ib flows through R1 and helps determine the voltage at the base which determines Ib which . . . See the problem?

For those who don't like algebra this is a good point to stop reading.

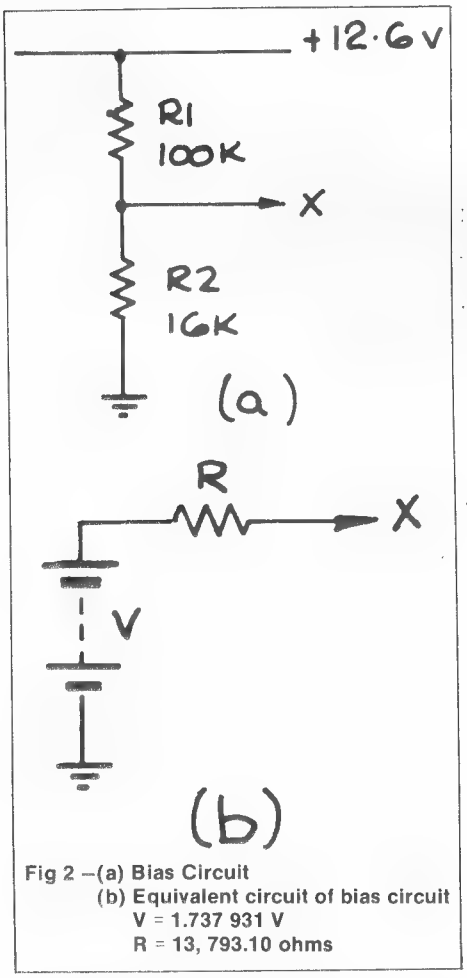


Fig 2 –(a) Bias Circuit
(b) Equivalent circuit of bias circuit
V = 1.737 931 V
R = 13, 793.10 ohms

To solve the problem we need to redraw the circuit and to go on step by step. Consider Fig 2(a) which shows the bias resistors R1 and R2.

As drawn the open circuit voltage at X is 16 x 12.6/(16 + 100) = 1.737 931 volts.

If we were to short X to ground the short circuit current would be 12.6/100 k
= 0.126 mA.

The bias circuit is equivalent to any circuit that has the same characteristics as itself. Fig 2(b) shows such an equivalent with V = 1.737 931 and R = V/0.126 mA = 13,793.10 ohms.
measurements between X and ground would not reveal any difference between it and that of 3(a).

Incidently we have just used Thevenin's Theorem to get the equivalent circuit. Note that we have simplified the circuit so our calculations should be easier. Let's check. In the original circuit only the transistor was connected. The transistor may be represented as a 0.6 V volt drop, drawn as a battery to account for the Vbe drop and a resistor equal to the emitter resistance A, 1 k ohm, multiplied by the current gain = 100,000 ohms. This is shown in Fig 3. Remember that the effect of Re at the base of transistor T is modified by the current gain of the transistor (the principle of the emitter follower).

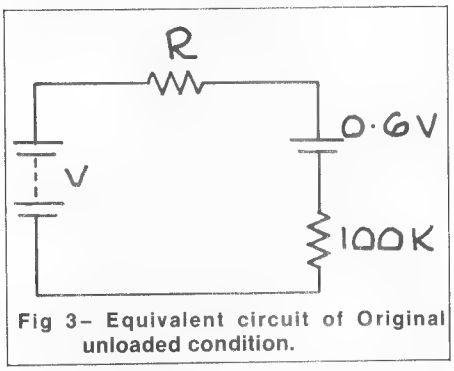


Fig 3– Equivalent circuit of Original unloaded condition.

The current flowing in Fig 3 is I = V/R = (1.737 931 - 0.600)/(100 + 13,793.1) mA = 0.01 mA

This is the base current of the transistor T which is the same as we calculated before. So our equivalent circuits are working!

Fig 4 shows the effect of the volt meter.

Note that so far, apart from Thevenin's Theorem which is really only a little logic, we have just been using Ohm's Law and a little knowledge of transistors. The next bit requires some algebra.

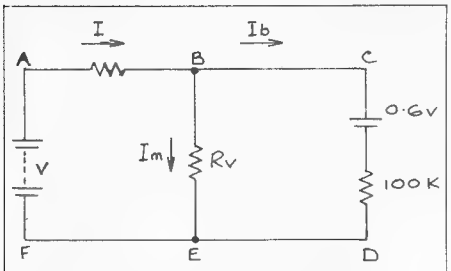


Fig 4 — Equivalent circuit with volt meter added.

V = 1.737 931 V
R - 13,793.10 ohms
Im = meter current
Ib = base current
I = Im Ib
Rv = 200 k ohms or 10 M ohms

We can proceed several ways but here is one method.

Consider the two current loops. AB EF and ABCDEF.

Firstly (1) V - IR - ImRv = 0
The volt drops must equal the supply voltage, or in other words the sum of the supply voltage and the volt drops in a closed circuit is zero.

Next (2) V - IR - 0.6 - Ib 100,000 0
Also (3) I = Ib + Im

Using equation (3) we can re-write equations (1) and (2) and putting in the numeric values we get
1.737 931 - 13,793.10 (Ib + Im) - 200,000 Im = 0
1.737 931 -13,793.10 (Ib + Im) - 0.6 - 100,000 Ib = 0

These equations can be solved to get Ib and Im. (Find someone studying year 10 or 11 at High School.)

If you work through it you will get Im = 7.5429 μA. The meter reading is of course Im x Rm = 7.5429 μA x 200 k = 1.509 volts

Similarly for Rm = 10 M ohm Vm is found to be 1.598 volts. Ok so it is not all that easy, but then the prize was well worth a little effort.

Actually the calculations are just a little tedious and not at all tricky. Although it is a practical problem you might encounter, it is beyond the AOCP syllabus — or at least at the moment the calculations are.

Of course if you have a small computer system that you can use then the task of calculating the voltmeter reading can be much easier. Although initially the answers were worked out longhand and the programme shown here was used to check the answers. Also shown here are the results of three runs for metre resistances of 10 ohms, 200,000 ohms and 10,000 ohms.

Those of you with computers may like to use the programme which is written in BASIC. Expert programmers may find room for improving the programme.

At this stage I too reserve the right to not enter into further correspondence or debate on this topic.

73 de
VK3AFW
AR

```
5 REM BIAS/VOLTMETER LOADING
10 R1=100000
20 R2=16000
30 RT=1000
40 VBE=0.6
50 HFE=100
60 VCC=12.6
70 INPUT"METER RESIST.";RM
100 VOC=VCC*R2/(R1+R2)
110 ISC=VCC/R1
120 REQ=VOC/ISC
130 A1=RM+REQ
140 A2=REQ
150 B1=REQ
160 B2=HFE*RT+REQ
170 D1=VOC
180 D2=VOC-VBE
190 GOSUB1000
200 IM=XNUM/DENOM
210 VM=IM*RM
220 PRINT"READING = ";VM;"V."
230 END
1000 REM SIMIL. EQN SOL.
1010 DENOM=A1*B2-A2*B1
1020 XNUM=D1*B2-D2*B1
1030 YNUM=D2*A1-D1*A2
1040 RETURN
```

Fig 5 — Computer Programme

```
RUN
METER RESIST.? 10E6
READING =
 1.59806295 V.

RUN
METER RESIST.? 200000
READING =
 1.50857143 V.


RUN
METER RESIST.? 10000
READING =
 .723287671 V.
```

Fig 6 — Typical Printout

QSP

AMATEUR EXERCISE

During the week between the 11th and 18th September the City of Sydney and the Premier's Department of NSW staged a Carnivale Festival. One of the many venues was a fun run on the 18th organised by the Labour Council of NSW. The run was to start at 9 AM at the Botanical Gardens, go past the Opera House through the Rocks area, across the Harbour Bridge and back to the start, about 10 km in all.

WICEN were approached to provide emergency communications. Unfortunately owing to a previous commitment, they were not available. A group of nine amateurs then organised themselves to provide a base station and some ten check points along the route. Richard, VK2ANB was monitoring from home and provided the only telephone link.

The frequency used was 144.8 MHz FM. Fortunately no emergency occurred and communications were progress reports only.

The following amateurs participated with great enthusiasm: Glenys VK2NMH, Bob VK2YPE, Simian VK2AVD, Steve VK2KBL, Gary and YL Carrol VK2ZKT, Peter VK2YDP, Martin VK2PJW, Richard VK2ANB, and Kurt VK2KBG.

The group received a letter of thanks and congratulations for a competent and professional exercise from the secretary of the Labour Council for NSW.

Kurt Reichstadter, VK2KBG
AR

Did you hear about the send-off party in the completely automated office? The computer got loaded and tried to unfasten the electric typewriter's ribbon.

from "The Lyrebird"
AR

Search & Rescue TRS-80

Can a TRS-80 have an important role in a search and rescue mission? Definitely, say several Utah TRS-80 users as they have demonstrated the use of the machine as members of Utah Civil Air Patrol in the USA.

Civil Air Patrol is a nationwide, volunteer organization dedicated to search and rescue, aerospace education and a youth programme.

Some of the functional programmes include compiling search effectiveness reports, listing a day's aircraft search effectiveness and — get this — offer a computer recommendation of best allocation of air search planes for the next day's effort.

Other programmes keep track of up to 50 planes participating on a search (listing pilot information, time launched, time landed and total hours flown), and programmes that convert latitude and longitude to the Air Force standard search grid (based on aircraft sectional maps) or converting the search grid back to latitude and longitude.

There are programmes that teach search and rescue technique by way of game format and programmes that keep track of people participating in search missions.

One of the most useful items of software is the "Aircraft Data" programme that keeps track of Utah Wing CAP's aircraft. This programme shows the status of the aircraft (including member-owned planes), the colour of each plane, and other items involved in search missions concerning pilot qualifications, plane equipment and configuration.

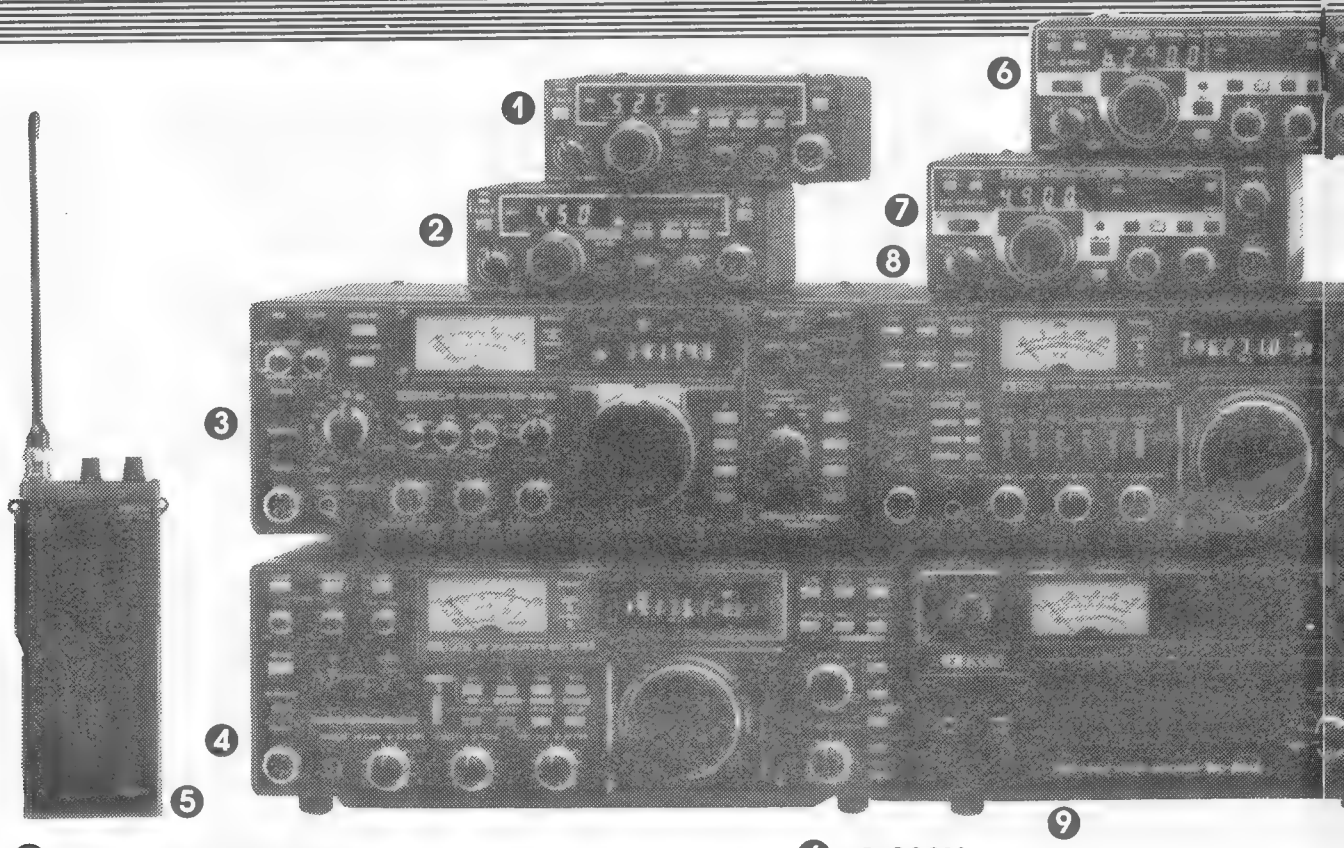
The air data programme runs on TRS-80 Model 1, 32K, with printer and disk. Other programmes will run on Level II, 16K.

The search programmes are easily changed to meet local requirements or even those of other groups apart from CAP involved in Search and Rescue missions.

TRS-80 owners or amateur radio operators who would like to obtain the software with the intent of assisting a search group are invited to contact Lt. Col. Jerry Wellman, Utah Wing Civil Air Patrol, 840 East 6th Avenue, Salt Lake City, Utah 84103, USA. **AR**

A Transceiver

Spoil yourself this Christmas with a speci



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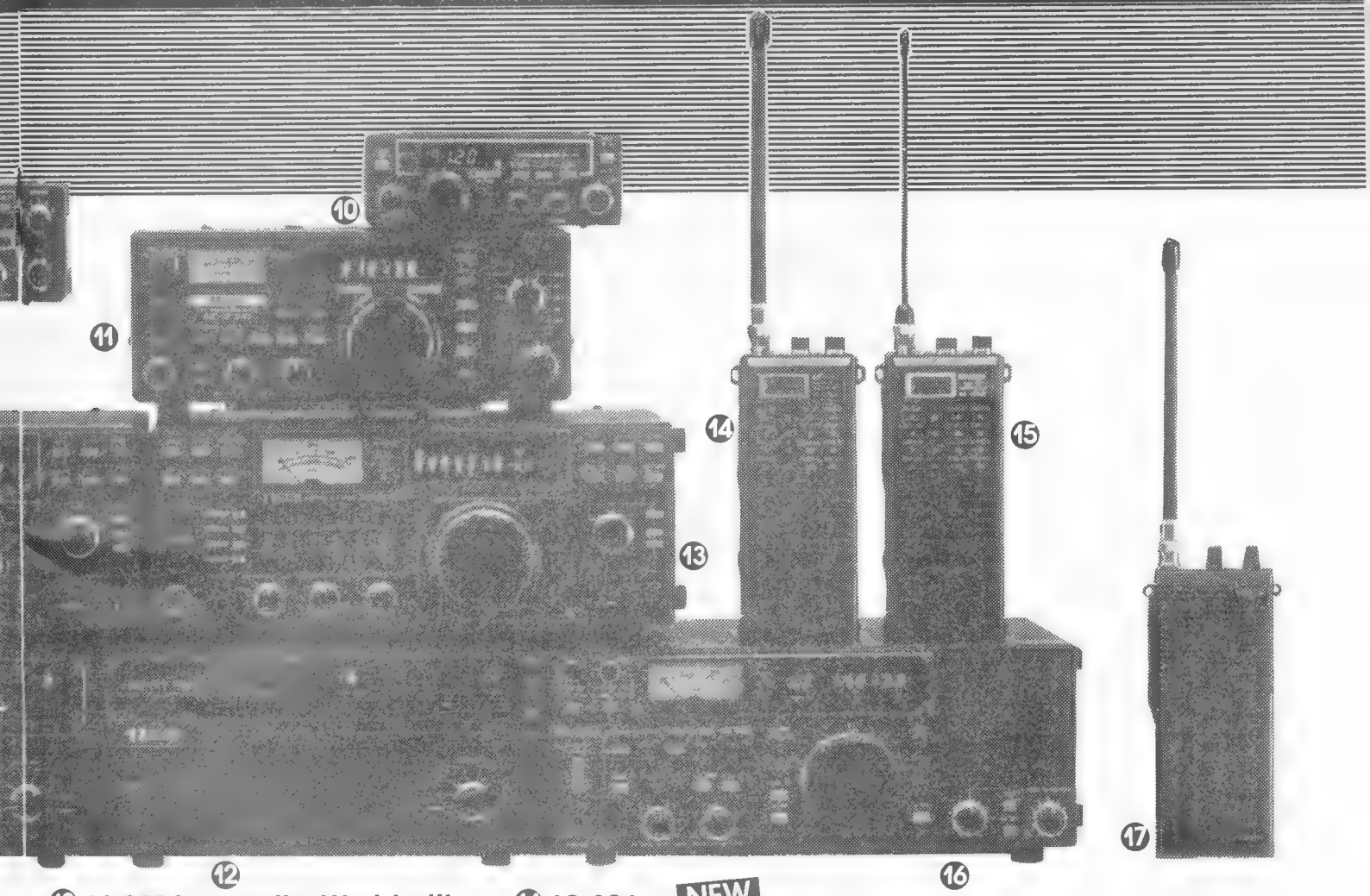

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INTERNATIONAL NEWS

"HAMS IN SPACE"

To commemorate the amateur radio operation of W5LFL aboard Space Shuttle "COLUMBIA" STS-9, a special philatelic cover (envelope) is to be issued in conjunction with the Solomon Islands Radio Society.

The cover will state "FIRST AMATEUR RADIO OPERATION FROM EARTH ORBIT" within the Amateur Satellite Corporation (AMSAT) logo.

A 45c Solomon Islands postage stamp featuring orbiter COLUMBIA will be affixed to the cover and cancelled on the first day of operation.

The cover will be available from PO Box 81, Honiara, Solomon Islands at a cost of US$1.00, 5 IRCs or equivalent for direct mailing by air.

Covers can be supplied in mint condition within a sealed envelope, by air, for an additional US$1.00 for up to 10 covers.

Examples:

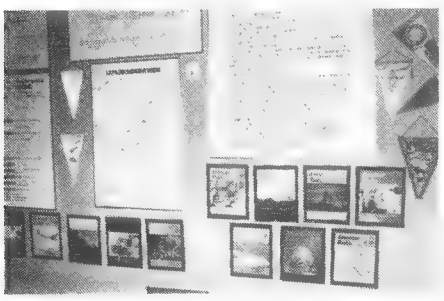
1 cover addressed and mailed	*US$1.00*
1 cover, mint, within envelope	*US$2.00*
5 covers, mint, within envelope (5 + 1 =)	US$6.00

Peter Taylor, H44PT

AR

JARL HAM FAIR '83

The JARL Ham Fair was successful in that it not only recorded the largest number of visitors, about 38 000, but there was also an IARU Region III booth, in commemoration of WCY, for the first time. The WIA was a participant in this booth.

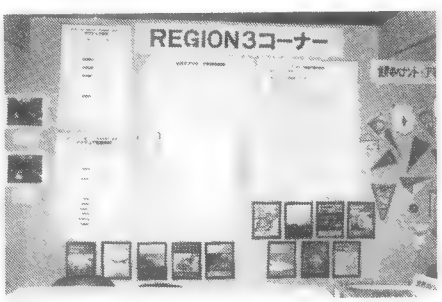


WIA material on wall.

The IARU exhibited several panels, written in Japanese, on the wall of the booth depicting the outline structure of the IARU and its regional organisations, their purposes and main activities in the past with particular emphasis being placed on the results of WARC-79, new HF bands and new UHF and EHF bands for the amateur satellite service.

Visitors showing great interest in the IARU booth.

Masayoshi Fujioka, JM1UXU, Secretary Region III, IARU.



Panels on the rear wall of the booth.

These exhibitions contributed to arousing interest in international amateur radio organisations and their importance.

AR

MALTA

The use of hand-held receivers is now permitted provided that they are used indoors as base stations.

JAPAN

The Radio Law of Japan has been changed to allow amateur radio operation by aliens in Japan. Main conditions are that the aliens' government permits Japanese citizens to operate similar stations in their country and that the Japanese Government determines the conditions to ensure equality of treatment. The first reciprocal agreement to be made under the new law was with the USA.

ZL1HV in Breakin Oct 83

AR

STS-9 UPDATE

The launch date of STS-9 has slipped from the end of October to the end of either November or February. After recovering the Solid-fuel Rocket Boosters (SRBs) from STS-8, NASA discovered excessive erosion of the ablative material lining one exhaust nozzle and funnel. The ablative material protects the metallic portions of the nozzle and funnel from burning through during the burn of the engine. (Once an SRB is ignited, it will burn until the fuel is exhausted.) Should burn-through occur during ascent, the Shuttle would probably be thrown into a violent spin and go off course.

ARRL NEWSLETTER DATED 13th OCTOBER

AR

TABLE OF AMATEUR RADIO FREQUENCY ALLOCATIONS FOR PAPUA NEW GUINEA AS FROM 14TH JULY 1983

Frequency Band (Category)	*Type of Service*	*Remarks and Restrictions*
1800-2000 kHz	AMATEUR	— This band has been extended to reflect the decision of WARC '79. Amateurs will be required to avoid 1870 kHz ± 4 kHz
3500-3700 kHz (Primary)	AMATEUR	— No change to this band
7000-7100 kHz (Primary)	AMATEUR AMATEUR-SATELLITE	- This band has been reduced in accordance with WARC '79 requirement Refer to RES 641
10 100-10 150 kHz (Secondary)	AMATEUR	— New band, allocate in PNG on 7th December, 1981
14 000-14 350 kHz (Primary)	AMATEUR AMATEUR-SATELLITE	— No change
18 068-18 168 kHz	AMATEUR AMATEUR-SATELLITE	Not allocated at this time due to existing services in neighbouring countries
21 000-21 450 kHz (Primary)	AMATEUR AMATEUR-SATELLITE	– No change
24 890-24 990 kHz (Primary)	AMATEUR AMATEUR-SATELLITE	— New Allocation. All Amateurs to avoid the frequency 24 900 kHz ± 4 kHz
28 000-29 700 kHz	AMATEUR AMATEUR-SATELLITE	— No change
50-54 MHz (Primary)	AMATEUR	— Change on category of service to the 50-52 MHz band
144-146 MHz	AMATEUR AMATEUR-SATELLITE	— No change
146-148 MHz (Primary)	AMATEUR	No change
430-440 MHz (Secondary)	AMATEUR*	– *Amateur-Satellite permitted 435-438 MHz in accordance with footnote 664 (Note band reduced from 420-450 Mhz)
440-450 MHz (Secondary)	AMATEUR	- This band is allocated in PNG under footnote 666
576 585 MHz (*Primary)	AMATEUR	— No change. This band allocated under Regulation 342 *Additional allocation in PNG on a Primary basis until such time as reallocated to the Broadcasting Service
1240-1300 MHz (Secondary)	AMATEUR*	— Band reduced from 1215 1300 MHz. *Amateur Satellite permitted 1260-1270 MHz in accordance with footnote 664
2300-2450 MHz (Secondary)	AMATEUR*	— *Amateur-Satellite permitted 2400-2450 MHz in accordance with footnote 664 Refer also footnote 751
3300-3500 MHz (Secondary)	AMATEUR*	— No change *Amateur-Satellite permitted 3400-3410 MHz in accordance with footnote 664
5650-5850 MHz (Secondary)	AMATEUR*	— No change *Amateur-Satellite permitted 5650-5670 MHz in accordance with footnote 664
10 10 45 GHz (Secondary)	AMATEUR	— No change
10.45-10.5 GHz (Secondary)	AMATEUR AMATEUR SATELLITE	— New allocation for Amateur-Satellite
24-24.05 GHz (Primary)	AMATEUR AMATEUR SATELLITE	No change
24 05-24 25 GHz (Secondary)	AMATEUR	— No change
47-47 2 GHz (Primary)	AMATEUR AMATEUR-SATELLITE	— New Allocation
75 5-76 GHz (Primary)	AMATEUR AMATEUR-SATELLITE	— New Allocation
76-81 GHz (Secondary)	AMATEUR AMATEUR-SATELLITE	— New Allocation
142-144 GHz (Primary)	AMATEUR AMATEUR—SATELLITE	— New Allocation
144-149 GHz (Secondary)	AMATEUR AMATEUR-SATELLITE	— New Allocation
248-250 GHz (Primary)	AMATEUR AMATEUR-SATELLITE	— New Allocation

SUMMARY OF FOOTNOTES

Below is a reproduction of the footnotes referred to in the Table of Amateur Radio Frequency Allocations for Papua New Guinea.

664 In the bands 435-438 MHz, 1260-1270 MHz, 2400-2450 MHz, 3400-3410 MHz (in Regions 2 and 3 only) and 5650-5670 MHz, the amateur-satellite service may operate subject to not causing harmful interference to other services operating in accordance with the Table (see No 435). Administrations authorising such use shall ensure that any harmful interference caused by emissions from a station in the amateur-satellite service is immediately eliminated in accordance with the provisions of No 2741. The use of the bands 1260-1270 MHz and 5650-5670 MHz by the amateur-satellite service is limited to the Earth-to-space direction.

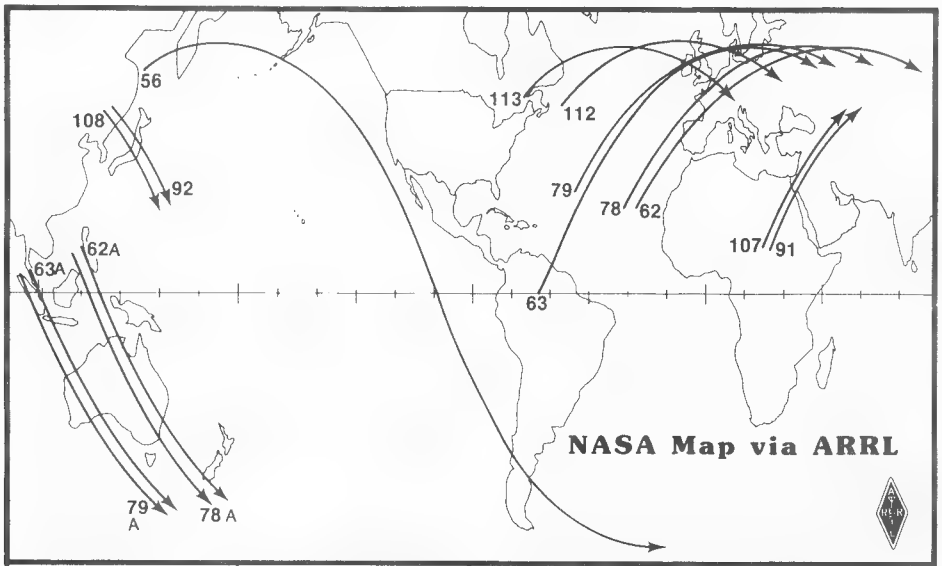
666 Additional allocation: in Canada, New Zealand and Papua New Guinea, the band 440-450 MHz is also allocated to the amateur service on a secondary basis.

751 In Australia, the United States and Papua New Guinea, the use of the band 2310-2390 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services.

AR

STS-9 AMATEUR RADIO DEMONSTRATION GROUND TRACK LOCATOR

WORLD OPPORTUNITIES (EXCLUDES U. S. PASSES)



START OF OPPORTUNITY MISSION ELAPSED TIME				END OF OPPORTUNITY MISSION ELAPSED TIME			START OF OPPORTUNITY MISSION ELAPSED TIME				END OF OPPORTUNITY MISSION ELAPSED TIME		
ORBIT	DAYS	HRS	MIN	DAYS	HRS	MIN	ORBIT	DAYS	HRS	MIN	DAYS	HRS	MIN
56	3	10	10	3	10	40	91	5	14	03	5	14	13
62	3	18	55	3	19	11	92	5	15	55	5	16	05
62 A	3	19	34	3	19	49	107	6	13	51	6	14	01
63	3	20	33	3	20	43	108	6	15	40	6	15	55
63A	3	21	03	3	21	18	112	6	21	20	6	21	35
78	4	18	44	4	19	00	113	6	22	54	6	23	10
79	4	20	17	4	20	30							

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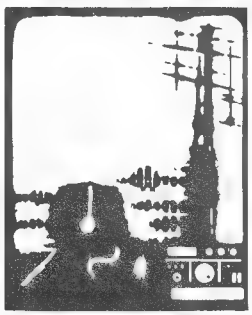

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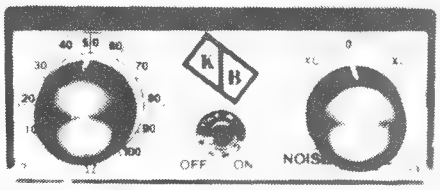

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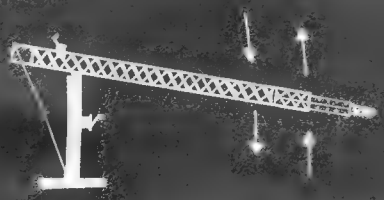

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NOVICE NOTES

Ron Cook, VK3AFW
TECHNICAL EDITOR

BUILD A BETTER BALUN

Why bother with a balun in the first place you may ask. A balun is a device which transforms a balanced load to an unbalanced load or, looking at it from another angle, it enables a coaxial (unbalanced) feedline to be connected to a balanced dipole antenna without the usual problems.

WHAT PROBLEMS?

If we refer to Fig 1 we see a transmitter producing an RF signal which is fed into a coaxial cable. A current I1 flows in the centre conductor of the cable and an equal current I2 flows in the opposite direction *on the inside* of the outer conductor. At any instant these currents retain the same relative amplitudes but are 180° out of phase.

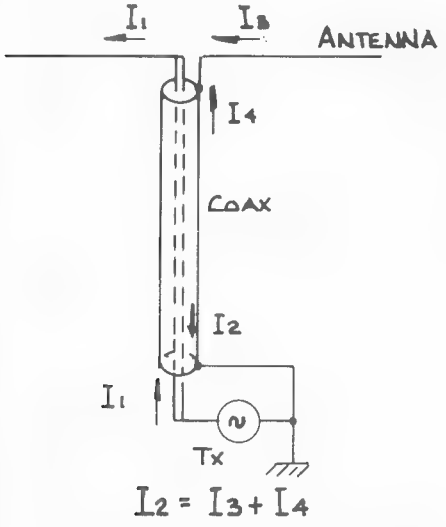

Fig 1. Illustration of the effect of connecting a coaxial feeder to a balanced aerial.

Meanwhile, at the antenna, which we have directly connected to the coaxial cable, we see that at this instant of time I1 is flowing from the centre conductor out along the antenna. If all were well and compatible we would have a current I2 flowing from the antenna back inside the coax. Because the current from the antenna does not see any difference between the inside and the outside of the coax a splitting of the current occurs with some current flowing down the outside of the braid and some down the inside. The division ratio, and hence the relative sizes of I3.

The antenna current, and I4, the outer coax current, is complex. If the coaxial cable is an odd number of quarter-wavelengths long then a high impedance will be seen on the outside and I4 will be negligible. I3 will then be equal to I2 and all will be well. If the cable is a multiple of half-wavelengths then a low impedance will be seen and I4 will be much larger than I3. The coaxial cable then becomes a significant part of the antenna.

Because of its proximity to the ground for part of its length (or a tower, guttering, etc) it will be lossy. Being largely vertical it will be vertically polarised and so will introduce more noise into the receiving system. Further, if the transceiver is not well grounded for RF, microphones, keys etc can be a source of RF burns due to lots of RF in the shack. The transceiver is connected to a radiating part of the antenna.

Intermediate lengths will produce intermediate effects. A balun can isolate the outer braid from the antenna and allow I3 to be the same as I2. Note that although Fig 1 shows I2 − I3 + I4. I3 and I4 can have large phase angle differences. Remember we are dealing with RF, not DC. I3 and I4 could even flow in opposite directions — that is I4 could have had the arrow pointing down. The situation can become literally quite complex and it is beyond the scope of this article to go into the mathematical proofs.

It is sufficient to say that the overall effect is to alter the antenna in respect to:

1 *Radiation pattern — shape is changed, vertical radiation increases.*
2 *Received noise level is raised due to pick-up on the outer of the feedline.*
3 *Antenna efficiency drops due to absorption of feedline radiation in nearby conductors.*
4 *Antenna system resonance and impedance are altered giving a different VSWR.*

Yes you can connect coaxial cable directly to a dipole and get good results but you can do better by using a balun.

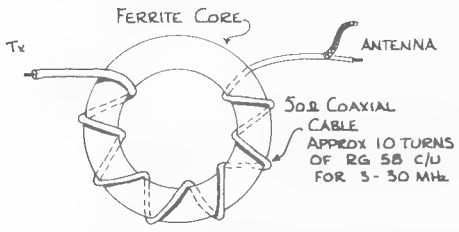

Fig 2. Illustration of method of winding of conventional transmission line 1:1 balun. Two separate insulated wires can be used instead of the coax if they are twisted together with say one twist per cm. (See text.)

A popular balun of conventional design is shown in Fig 2. For a 50 ohm system a 50 ohm cable is wound on a ferrite core to produce an inductance of about 250 ohms reactance at the lowest frequency of use. The large (6 mm dia) red core sold by Dick Smith and others is quite suitable for HF. Even a core from a TV EHT transformer works well.

Note that about a quarter of the core is left free of winding. This is because the high frequency limit is set by resonance of the inductance of the winding and the shunt capacitance. Capacitance across the end of the winding is thus important and is reduced by keeping the ends of the winding apart. The upper frequency limit is the frequency at which the reactance falls below 250 ohms.

In fact the reactance rises with frequency until parallel resonance occurs.

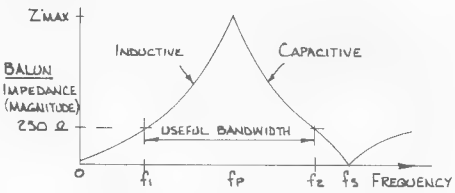

Fig 3. Plot of balun Impedance.
f_1 — lower frequency limit
f_2 — upper frequency limit
f_p — parallel resonant frequency
f_s — series resonant frequency

Further increases in frequency are accompanied by a fall in reactance magnitude until eventually series resonance occurs. See Fig 3. The useful range extends above the parallel resonant frequency even though the reactance is capacitive — it is the reactance magnitude that is important as this "throttles" the current trying the flow down the outside of the coax.

Actually the coaxial cable winding can be replaced by a two wire transmission line although for the best results (lowest VSWR over greatest bandwidth etc) the transmission line should be the same impedance as the feeder (which will be coaxial) which in turn should be the same as the antenna.

Twin feeder of 50 or even 70 ohm is not as readily available as coax. Commercial baluns often use enamelled wire twisted together. This can be quite satisfactory. I believe that for the home brewer a better alternative is to use a length of figure-8 240 V flexible twin cable. A length of about one metre should be cut off and the two conductors split apart to form two wires. Be careful not to bare the wires except at the ends. Put two ends in a vice and tighten the jaws. Pull the two wires out until taunt and fit them into the chuck of a hand drill. Turn the hand drill to twist the wires tightly together. The length of the cable will shorten slightly. When removed from the drill and vice the cable will untwist a little but it should retain at least one twist per cm. If not, repeat the twisting process.

In original form the figure-8 flex (called zip cord in the USA) has an impedance of around 140 ohms and is suitable for use up to 21 MHz without much loss. When twisted as above it

has an impedance of 60 to 80 ohms and makes a good low loss 3-30 MHz balun.

This balun works well with a dipole which is in the clear. It is not quite so good when the dipole is unbalanced due to say proximity of trees or bends in the dipole legs.

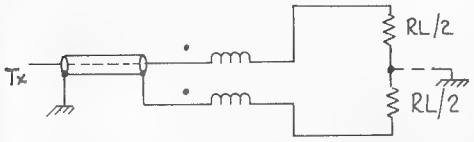

Fig 4. Schematic diagram of conventional transmission line 1:1 balun. This shows that it provides isolation but balance is not guaranteed unless the centre of the load is grounded.

Referring to Fig 4 we see a schematic diagram of the balun. If the load is symmetric and grounded in the centre (as is the case with many triband beams) then the balun provides both balance and isolation. If the load is not balanced then isolation (reduction or elimination of the outer coaxial cable current) is obtained but not balance, leading to radiation pattern distortion and changes in VSWR. The bandwidth of the balun may be reduced.

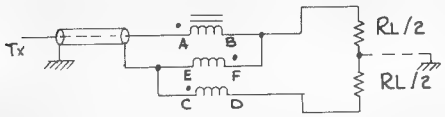

Fig 5. An improved 1:1 transmission line balun. An additional winding EF has been added to give balanced output as well as isolation. The load need not be grounded in the centre.

The solution involves adding a third (tertiary) winding to provide a balancing function. Refer to Figs 5 and 6. Fig 5 shows that a third wire is wound in intimate contact with the other two so that it has equal turns and shares the same flux. The start of the winding, F, is connected to the inner conductor at the finish of its winding, B, and the finish of the tertiary winding, E, is connected to C, the start of the outer braid.

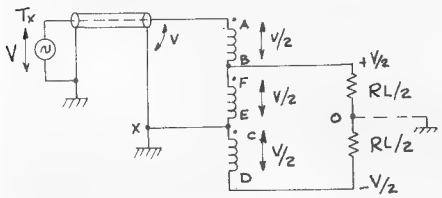

Fig 6. The improved 1:1 transmission line balun redrawn as an auto-transformer. As with the conventional design twisted wires may be used instead of coax. (See text.)

This winding carries very little current as the load current flows through AB and CD. The means by which winding EF provides balance can be seen by referring to Fig 6.

Note that Fig 6 should not be taken too literally as representing a complete equivalent circuit for the balun.

As windings AB and FE appear in series across the end of the cable their total voltage is V. If they have the same turns then each has V/2 across it. Winding CD has the same turns as AB and so has V/2 across it also. The load is across FE and CD and has V/2 + V/2 = V across it. The centre point EC is connected to the coax braid which is nominally at ground. It may be grounded to the tower etc. Thus the load at a particular instant will have +V/2 at one end and -V/2 at the other (with respect to ground) whether or not point X is grounded.

If no current flows on the outside of the coax it has ground potential all along its lengths. (No current = no volt drop.)

Removal of winding FE could allow points X to take up a different potential and current would then flow outside the coax.

A tertiary winding may be made using half of a length of flex or a length of enamelled wire of say 22 SWG.

If you have a commercial balun and want to check whether it has a tertiary winding a simple check can be made with an ohm meter. Remove the balun from circuit and measure the resistance betwen the two input leads. If it is low there is (probably) a tertiary winding. If it is open circuit there is no tertiary winding.

In some baluns the winding is made along a rod of ferrite. This does not alter the operation although more turns will be required for a given inductance.

There are many other forms of balun other than the simple 1:1 device described here. The next most common type gives a 4:1 impedance ratio but many other ratios are possible as can be seen by reading the references.

SPECIAL NOTE FOR READERS

1. I welcome contributions to this section especially construction articles suitable for beginners, novices and SWLs.

2. If there is something in one of these columns that puzzles you or you want to take issue over a point please re-read the article before putting pen to paper. Then if you still have a need to write please include an SAE. I certainly don't want to discourage reader's letters as they are a most important feedback — I always reply personally — but observance of the above two points will reduce my stationery bill.

73
Ron, VK3AFW

References
1 ARRL Radio Amateurs Handbook 1982 Ed, Chapters 3, 19.
2 Nagle, J J, K4KJ, "Testing Baluns", Ham Radio, Aug 1983, Vol 16, No 8.
3 Reisert, J, W2JR, "Simple and Efficient Broadband Balun", Ham Radio, Sept 1978, Vol 11, No 9.
4 Nagle, J J, K4KJ, "High Performance Broadband Balun", Ham Radio, Feb 1980.
5 ARRL Electronics Data Book, 1976 Ed, Chapter 5.
6 "Novice Notes", Amateur Radio, March 1983, Vol 51, No 3.

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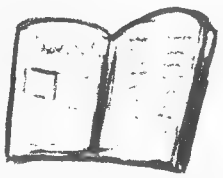

MAGAZINE REVIEW

Roy Hartkopf, VK3AOH
34 Toolangi Road, Alphington, Vic 3078

(G) General. (C) Constructional. (P) Practical without detailed constructional information. (T) Theoretical. (N) Of particular interest to the Novice.

WORLDRADIO. SEPTEMBER 1983. American magazine-newspaper with news and information. A new "amateur handbook" which should be avoided. (G).

BREAK IN. SEPTEMBER 1983. Synthesised Speech readout of frequency. (P).

WHAT'S NEW IN ELECTRONICS. SEPTEMBER 1983. General information on new products, components, equipment etc. (G).

73 MAGAZINE. OCTOBER 1983. Fourteen new construction projects. (G). Experiments on 1700 metres. (G).

HAM RADIO. AUGUST 1983. Packet radio. (T). Testing Baluns. (P).

QST. AUGUST 1983. RF Power measurements. (N). Design of Pi networks. (T).

CQ - TV No 123. AUGUST 1983. PAL Coder. (P). NBTV. (G). 70 cm Linear. (C).

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EXECUTIVE REQUIREMENT

The Federal Executive requires a VIDEO RECORDER in the BETA FORMAT, in excellent working order, for the Federal Video Co-ordinator's use.

Any member that may be able to help should contact:

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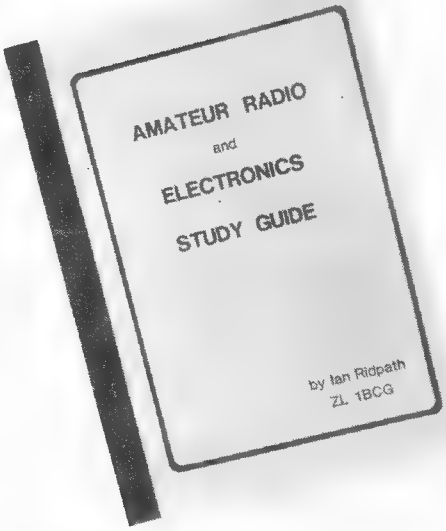
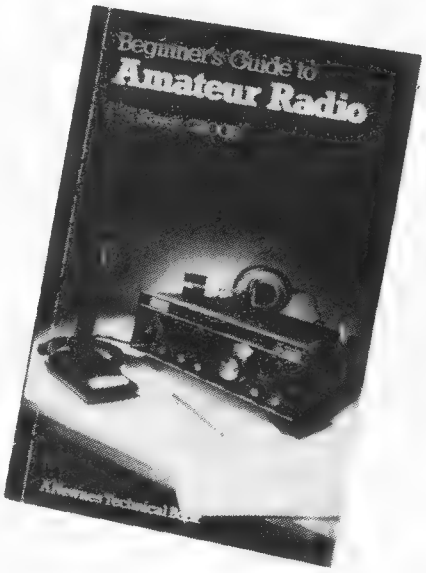
BOOK REVIEW

Ron Cook, VK3AFW
TECHNICAL EDITOR





AMATEUR RADIO AND ELECTRONICS STUDY GUIDE

by Ian Ridpath, ZL1BCG. ISBN 0-473-00149-7

This excellent book is unusual in that it is entirely handwritten and not typeset. As with the work of the old scribes the text is clearly printed in a neat and individual hand.

It is the author's contention that students learn faster when they have a study guide which presents the theory in a concise and uncluttered way. The text is comprehensive in its coverage and is accompanied by several technical and explanatory drawings on each page. In spite of the author's intention, the format does on occasions get a little cramped.

Sufficient material is included to cover the requirements of the Grade III amateur radio examination conducted by the New Zealand Post Office. In doing so it exceeds the requirements of all grades of Australian amateur licences and fills the gap between simple beginners tracts, Novice study guides and the professional engineering texts. Topics covered include:

Resistors
DC, AC, Frequency
Capacitors, Vectors
Inductors
Magnetism
Transformers
Reactances in series and parallel
Resonance
Semiconductors
Power supplies
Amplifiers
Oscillators
Valves
Radio transmitters
Radio receivers
Radio waves and propogation
Aerials
Transmission lines
Test instruments and measurements
Problems, with answers and useful formulae.

Some 10 percent of the book goes beyond the requirements of the AOCP theory: even so the book would be a valuable aid to anyone studying for either the NAOCP or AOCP theory exams. Topics recently appearing in NZPO exams are marked with a flag.

The diagrams are well chosen, each one being worth nearly 1000 words, and help to make the theory more readily absorbed. Overall this book compares most favourably with locally produced texts in the same category. Teachers of courses in amateur radio should seriously consider this book as a standard text.

The review copy was kindly provided by the author. Copies may be available shortly through Magpubs.

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BEGINNER'S GUIDE TO AMATEUR RADIO

by F G Rayer, G3OGR. Newnes Technical Books. ISBN 0-408-01126-2

To the outsider, amateur radio may seem to be a form of CB or, on closer acquaintance, a highly technical and mysterious hobby. Any person with a curiousity about amateur radio and "serious" short wave listening would find this book invaluable.

Young budding engineers, scientists and technicians now at secondary school could find an introduction to the prince of hobbies (amateur radio) through reading this book.

Frank Rayer writes with an easy style and covers every significant aspect of amateur radio and short wave listening. A generous number of drawings, circuits and graphs are used to lucidly explain each important aspect. Although this book is written about the hobby as practiced in the UK it will be of value worldwide. The theory of radio communication is painlessly explained to the layman. Indeed, at the end, a casual CB operator would be well on the way to successfully sitting for a Novice licence. The reader would become as well informed about all aspects of amateur radio as most experienced amateurs — at least in the general sense if not in technical details of some complexity.

Those aspects of amateur radio that often baffle the uninitiated are clearly explained. Frank Rayer was well known, through Europe especially, for his technical writings. Sadly he died shortly after completing the manuscript for this book.

It may be that had Frank been able to proof-read the manuscript the minor criticism I have would have been unnecessary. That is that some terms are introduced and used without explanation, for example Hz, S/N, VK, VK7. There may be others that I did not find, but as hundreds of other similar terms are covered it is not a bad score.

If you want to know "all about amateur radio without really trying" (or becoming one) then this is the book for you. Who knows, after reading the book you might find yourself smitten with the bug. If you want to avoid that fate then don't read this book.

The review copy was kindly provided by Butterworths, NSW. Copies can be obtained from most good book stores at a recommended price of around $12.

AR

REMINISCING AND REALITY

Leo Weller, VK3YX
46 Peperell Avenue, Syndal, Vic 3150

REMINISCING AND REALITY

To divert my inquiring mind after I, at a young age had already wrecked the kitchen clock, the tin opener and the gramophone, my father introduced me to Meccano.

This provided me with many hours of great enjoyment at my "Meccano table" in the corner of my bedroom and an easy choice of presents for my parents, uncles and aunts.

With another birthday coming up soon, I asked my father during dinner if I could have a 20 cm horizontal-thrust ball bearing with gear teeth from the special parts department of Meccano instead of the usual Meccano box 1A. My mother, instantly realising that my father had no idea what I was talking about, suggested that I accompany him to the shop giving me the opportunity to select that item myself.

With this, a tradition was born which lasted many, many years. The only change being from the Meccano to the radio shop, which my father accepted without a blink of an eye — probably realising that I was growing up.

After the radio shop we would go to a coffee lounge and, while sipping coffee my father would listen to me, trying to enter my world of electronics so far removed from his extremely busy business life.

The tradition was accepted and continued by the YL and later the XYL.

Panic station was on when the oldest girl, then three years old, found a hidden 18 AVQ antenna under our bed two days before Christmas. This meant that a substitute present had to be placed under the Christmas tree.

We had no answer to the question "how would Father Christmas know that Dad likes a silly egg slicer?". This being a precious Barker and Williamson splitstator.

Contemplating on all this we are slowly tuning up and down the seemingly closed 15 metre band, an endless desert of white noise.

My good XYL carried the tradition over to our three daughters. However, when I arrive home with the parcel it is instantly confiscated from me with a friendly smile. The next time I see it, it is gift-wrapped and laying underneath the Christmas tree.

Nevertheless, for the girls, presents have a rating. A book is on top. Tools, cable, coax is alright, but who wants to give a crystal, one can hardly see it!

Dreaming of the future I hope our sons-in-law and grandsons again have this privilege and advantage of a then very old family tradition.

Hey! The band is opening up, there is a signal, very weak — dah dit dah dit dah dah dit dah. Still weak but readable BY1PK. That is the only amateur station in China!

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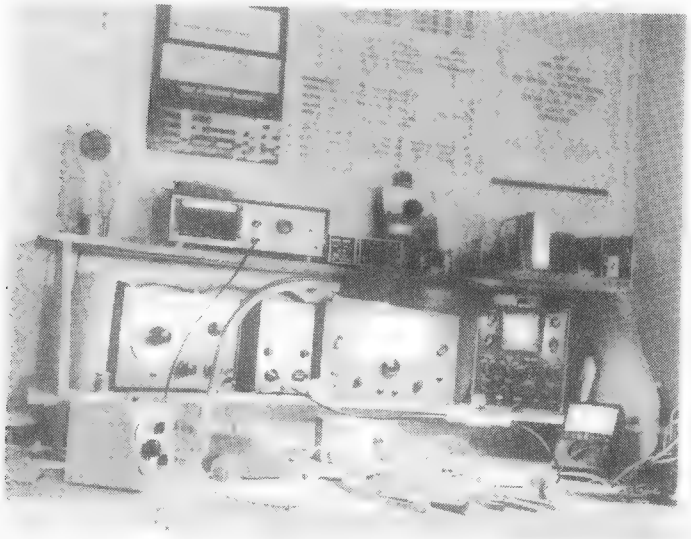

Reality

REGULATIONS AND STANDARDS FOR THE NEW RADIO-COMMUNICATIONS ACT

Very shortly the Radiocommunications Bill will become an Act. It is essential that we now turn our attention to the associated Regulations and Standards.

The Bill/Act is mainly a legal document and dealing with it was mainly a legal operation. The Regulations and Standards will be far more technical and rather less legal: therefore, far more members of the Amateur Radio Movement will be in a position to contribute with comments, suggestions and material towards ensuring that, wherever possible, the regulations and standards associated with the new Radiocommunications Act are as favourable as possible to the Amateur Radio Service. Of course, we cannot expect to win on every aspect; however, with a concentrated and co-ordinated effort, and the pooling of all available resources by ALL Australian amateurs should ensure that we have the best chance to make a "fair dent" in this most complex area of the new Act.

Yes, the Regulations and Standards will, almost certainly, be highly technical and highly "politically" charged. It will therefore be most advantageous for us, the Amateur Radio Movement, to ensure that we keep our own house in order, ensuring the minimum of internal politics. This is one area where we need to break down any barriers which may exist between various factions within our movement, and present a united front. Let's make sure that ALL the resources available to the Amateur Radio Movement are concentrated behind one central co-ordinated effort. This is one area where, "United we stand — divided we fall".

The Wireless Institute's CASPAR (Communications Act Special Planning And Response) Committee has been instructed by the Federal Executive to provide an independent response to all regulations and standards pertaining to the new Act. The committee has been instructed to co-ordinate and correlate material and information from ALL Australian amateurs and to consider all available information, including overseas information, in relation to the various regulations and standards as and when they are presented by the Department of Communications. The CASPAR Committee recognises the material which was submitted during the review of the Radiocommunications Bill but was held over due to its relevance to regulations and standards.

The CASPAR Committee will require the assistance of ALL Australian amateurs with, what could be, one of the most complex and difficult issues to which the Amateur Radio Movement has ever had to address itself.

All correspondence in connection with any aspect of the Radiocommunications Bill/Act should be directed to: *The CASPAR Co-ordinator, Tony Tregale, VK3QQ, PO Box 300, Caulfield South, Vic 3162.*

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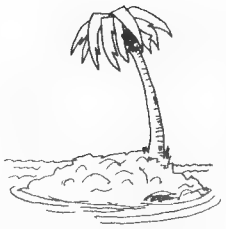
NOTICE

ALL copy for inclusion in February 1984 Amateur Radio must arrive at Box 300, Caulfield South, 3162 no later than 3rd January.



HOW'S DX

Ken McLachlan, VK3AH
PO Box 39, Mooroolbark, Vic 3138

Stephen VK2PS, a Federal Councillor and constant contributor to this column has made a number of pertinent comments with reference to my remarks in September AR.

Stephen comments that "VK amateurs are not very good QSLers in general and few make the exeption but this phenomenon is not a new development. When I was first licenced in Europe in the late 1930s, it was well known to the fraternity, that to receive a VKQSL card was a pure miracle and that has not changed over the years."

Stephen, quotes the example that he entered the 1982 ALARA contest, had sixteen VK QSOs and QSLed the lot. After twelve months waiting, he is the proud owner of five return cards. Just over a thirty percent return. Not really good for a fellow VK operator! One wonders how an overseas operator would fare.

Another valid remark that is made concerns the VK2 Divisions incoming QSL card cabinet which is bulging to the seams. Stephen writes "I wonder why the recipients are not picking them up? If they do not QSL, why not tell the other party during the QSO that they do not and no card should be sent. If they feel that it is impolite to tell the unfortunate amateur on the other end, that he, the VK amateur, does not QSL, it is definitely rude not to reply to a card, even if it is not wanted."

Further to the above, Stephen remarks "that for many a contact to VK by overseas countries, it is a very valued contact, in many cases their first and that card could be needed for DXCC and other awards. But alas — VKs do not QSL and the few who do, your cards are certainly valued overseas."

Not to be overlooked of course is the SWLer, and as Stephen points out, quite a few VK amateurs are unaware, that it is obligatory in certain countries, before receiving a transmitting licence, that they provide proof that they are adept in the methods of reception and have a general interest in the hobby. Stephen urges all amateurs to reply to all SWL cards if they are legitimate.

Other notes extracted from Stephen's letter include the wane of DXing in this country, which was evident by the multitudes descending on the minority of SSB operators who were evident on the twenty metre band during the recent VK/ZL contest. My personal opinion is that the VK operator has many facets of the hobby available to research, from DXing to RTTY, SSTV, AMSAT, VHF to name a few without considering construction of that "special" project, perhaps we have too much to occupy our leisure time or are we just lethargic.

Another of the comments made in the lengthy letter by Stephen is that "Ragchewing" is fine, nice and essential, but nothing beats the joy, the elevating feeling of good luck and reward for patient listening and searching, when one has a successful QSO with the one only amateur in a certain overseas country. An example of this is a QSO with D44BC the only active amateur in that country.

Thankyou Stephen for taking the time to sit down and commit a few of your thoughts to paper. Have we any other takers with any ideas?

A FIRST

A number of firsts were claimed by Graham VK6RO for CW and SSB on the 18 and 24 MHz bands (refer AR August 1983, p25).

No other amateur has forwarded any documentry evidence that they beat Graham to the honour of being the first, so Graham it appears that it is all yours. Congratulations on your efforts and the use of the new bands so promptly.

HUNTING LIONS

A contest, which is sponsored by Lions International annually, to promote international relations and further friendship between individuals of different nationalities. The trophy has been won again for the second consecutive year for the SSB section by Lindsay VK6NO. The CW section was won by well known DXer Tim BV2A. Congratulations to both operators.

The 1984 contest will be held on the 14th January and further details may be had from Alan Heath, PO Box 1904, GPO Adelaide, SA 5001.

CHINA ON SSB

It was pleasant to hear Tom VE7BC, working from BY1PK and trying to satisfy all comers under very arduous conditions.

All countries including VK and ZL were given excellent opportunities to work this much wanted country and the operators took advantage of airing their lungs in the split operation.

Some operators were very critical of the amount of spectrum used for the split operation, but on this occasion it was justified in my book. This amateur was operating under severe difficulties, apparently there was a high QRN level to start with, the QRM was unbearable as propagation was open to many continents at the same time and it necessitated spreading the listening area to 60 kHz. It is a one off occasion really when one thinks of it.

Severe drift was only one of the problems that Tom had to contend with, which was probably caused by fluctuating line voltages. The linear was playing up and arcing to some extent and not once did I hear this gentleman lose his "cool".

Congratulations Tom on a job well done and your assistance to the amateurs of China over a considerable period has culminated in you giving many amateurs, worldwide, a new country on SSB towards the end of WCY 1983.

The self appointed policemen that manned the BY1PK transmit frequency probably meant well in advising everyone of the listening frequency area but one ZL overdid it a bit in my book. If you were lucky enough to be called you would never have heard your call because of the QRM but Tom, as I said before, was very patient.

NEW PREFIX ALLOCATIONS

The New Zealand Post Office has announced new prefixes which will become effective as from the 1/1/84.

This rearrangement leaves ZL1-4 as it was, ZL5 Antarctic Bases, ZL6 Intruder Watch and Emergency stations, ZL7 Chatham Islands (formerly ZL/C), ZL8 Kermadec Island (formerly ZL/K), ZL9 Auckland and Campbell Islands (formerly ZL/A) and visitors will receive a ZL0 prefix.

Tokelau presently ZM7 will change to ZK3. It is not clear whether existing amateurs in these areas will still retain the calls they are using this year until they finish their tour of duty or revert to the new system immediately.

BANGLADESH

Apparently the licensing authorities have had a change of heart and have at last decided to allow amateur activity.

This is indeed a breakthrough that another country has officially joined the amateur ranks again and it is a tribute to the amateurs in this country that have been working behind the scenes to bring this event about.

GLOBETROTTING AGAIN

Iris and Lloyd Colvin, W6QL and W6KG, are on the move again. This time it is down South America way with envisaged stops in Columbia, Ecuador, Peru, Bolivia, Chile, Argentina, Uruquay and Paraquay.

They both hope to be active on all bands, SSB and CW, and will be paying particular attention to the lower bands including thirty metres.

Lloyd and Iris ask that all operators limit QSO's to one per band per mode per country and please QSL to the Yasme Foundation, PO Box 2025, Castro Valley, California 94546.

ALBANIA???

After a seven week excursion in BY, Marcel F2SA hopes to be in ZA between the 15th January and 15th February.

Marcel who is a UNESCO official thinks that there will be a possibility to obtain an amateur licence.

DESECHEO ISLAND

At the time of writing these notes there is an unconfirmed report from a reliable source that this island will be activated next month.

Watch out for anyone signing KH5!

4U1ITU

4U1ITU was active on the 23rd October

to celebrate the commencement of the International Telecom '83 Exhibition and Conference.

A special certificate to commemorate this event in World Communications Year will be made available to all amateurs that contacted the station on this day and to SWLers on a heard basis on application to Rudi F8RU, who is the manager of the ITU.

KERMADEC

Latest reports are that Warwick should be active from this month. For latest reports on this much sought after area it would pay to monitor the International Pacific DX Net on Tuesdays and Fridays at 0600 UTC on 14.265 MHz +/- QRM.

BURUNDI

Jim "Bull" Bullington ex TYA11, now the American ambassador in that country has obtained an amateur licence. His tour of duty is for two years and his call is 9U5JB QSL ON5NT.

MALPELO ISLAND

Well this much wanted country was activated as planned and all Pacific island areas were well catered for. The operating techniques used by the group, as found at this QTH were excellent.

Signals were not as strong as anticipated and it is thought that the operators were not able to reach the top of the island which is 375 metres above sea level. To achieve better coverage of the world, it was envisaged that a helicopter, from the Columbian naval boat that took them out, would be necessary to achieve the optimum position. Apparently this facility was not available.

The unnecessary QRM on HK0TU's transmit frequency is something that everybody could have done without. This back chat from the guardians or policemen on the frequency emanated from all continents and many familiar voices, including those of VK operators, were monitored. Gentlemen, no YL operators were monitored, it is completely unethical let alone being illegal to QRM another station.

Maybe it is time that all amateurs brushed up on their DXing techniques, and perhaps it would be a good resolution for 1984, to assist rather than resist rare DXpeditions that cost figures that sound like telephone numbers to launch and that is not taking into account the unpaid hours of all the volunteers.

AVES ISLAND

This island is located at co-ordinates of 63°38'W and 15°42'N with approximate dimensions being 570 metres long, 130 metres at the widest point narrowing down to thirty metres at the other extremity. The whole area is only three metres above sea level at high tide.

In conjunction with the Radio Club of Venezuela's golden anniversary's celebrations it is hoped to activate this area at the end of February 1984. Actual dates are dependent on the Venezuelen Navy's commitments and a stay of three days is envisaged.

The call will be YV0AA with both SSB and CW modes being used on envisaged frequencies from 160 through to 10 metres. QSL arrangements are in the hands of YV5DFI, PO Box 50332, Caracas 1050-A Venezuela.

WANTED COUNTRIES

The DX Bulletin conducts an annual "Wanted Countries" survey and in 1983 640 DXers were sampled. The top ten wanted countries according to the survey were ZA — 84%, VU/L — 82%, XU — 78%, 70 — 76%, XZ — 74%, VU7A — 74%, 3Y — 73%, CE0X-San Felix — 72%, BY — 71% and XV — 68%.

Those wanting VK9M were listed at 27%, which looks like that it is now well down the list.

It is wondered how true this sampling would hold for the VK operators. Perhaps it is some form of an indication to the much wanted amateur confirmations for DXCC.

LIBYA

G3SYM departed for Libya on a year's contract working for the Telecommunication Ministry and will attempt to obtain a licence.

If he is successful, on returning home for leave at Christmas, he will return with a transmitter and antenna to operate during the rest of his stay. Here's hoping for a genuine operation!

ARRL DXCC

Latest news is that the recent XU operations will be accepted for DXCC according to the DX Advisory Committee vote. Also there was a recommendation that Spratly is to be retained on the current countries list but the final decision will be made by ARRL Headquarters.

Other news is that XZ9A alias 1Z9A etc will not be accepted, as the hobby is banned in Burma.

QATAR

Mike A71AD, a constant visitor on the International Pacific DX Net, in a letter recently received describes his operating conditions from a very neat "shack".

The upper frequency station uses the FT1 transceiver driving a FL2100 linear which acts as a buffer to drive an Alpha 77SX. (We have always wondered why you always have a big signal on twenty Mike, now we know!) Mike uses a TH7DX on the higher bands, a 402BA yagi on 40 metres and an inverted "Vee" on 80 metres.

The upper frequency station used the FT1 and a FTV107R transceiver which drives a Mirage D1010 linear. The uplink antenna is a KLM 420-450-18C. The down link is catered for by a KLM 143-150-14C. The ERP of the system is approximately 800 watts.

Mike mentions that he was the first foreigner to be granted an A7X licence since independence some fourteen years ago and as there is no club or bureau facilities all QSL's must be direct as per the callbook.

CONFUSION

A note from F6AJA may clarify the confusion that existed in the early 1970's with the operation of VK0HM.

Gerard F2JD, was operating on Kerguelen Island as FB8XX, when a request was made by the Australian government for some assistance to the party that was on Heard Island. This amateur volunteered for the expedition, was accepted, and contacted the VK authorities for permission to operate an amateur station whilst there. Permission was granted in the form of a telex that read "OK for operation on arrival at Heard".

Upon arrival at the island, this amateur saw the call sign VK0HM on the wall of the shack and used it in lieu of his own F2JD or FB8XX/VK0 Heard. At that time all the operators on Kerguelen used FB8XX and he naturally assumed it was the same for this Australian outpost. Gerard used this call during February and March 1971.

The former owner of the call, WA6EAM, complained to the ARRL and the operation was disallowed as being creditable for DXCC purposes.

A genuine unfortunate misunderstanding, that cost quite a few DXers heartbreak on not being allowed credit for a valid contact due to confusion and a possible language barrier.

Mike at the controls of his super station.

ANTARCTIC LOGS

Peter VK3FR, QSL Manager for VK0AP, as with some other QSL Managers for Antarctic stations, will be receiving logs in the near future when the operators return home. This will enable them to process the balance of the cards that are outstanding, including those that have not been verified by the exchanging of logs on the amateur bands, an excellent practice in theory, but one which is not always convenient to all parties.

JANUARY'S COLUMN

Owing to the early deadlines, due to the holiday season that typesetters and printers enjoy, the January notes have been prepared in advance by Jim VK3YJ. Don't miss Jim's summary of 1983.

CW SWLING WITH ERIC L30042

28 MHz
I4EAT, JE7JZC, KX6QC, UA0OCI, VE7AAQ, KF1Z, W6TMD, W7LNG, AJ9N

21 MHz
DJ6BN, F6FTT, FK8KAA/P, FO8HO, HB9BNI, HL0J, KH6DW, LU8DRB, LZ1EA, UK2GAC, UK9HAA, VE7AAQ, VK8NHG, VU83VZ, WL7T, Y54ZA, YJ8MP, 4S7WP

14 MHz
CO2HT, CS2QN, CU1CHG, EI9FG, EN6A, FK8BU, FM7BZ, FM7WH, G3ABN, HA5KFL, I2AMH, KH6CF, KP4BBN, OE3NBB, SP5BGA, VP9DR, VU2SKP, YB5ASO, YV5ANT 3B8FG, 4S7NS, 4Z4MK

10 MHz
DJ2XJ, F3NB, G3RHI, OK1DAV, OZ9XD, W1JY, N4SU, W8EGB, VE1BB, Y24DO, Y39XO

7 MHz
DL7AFV, EN6A, HA8ZC, I4RYC, LX1PD, ON6BR, TI5BGA UR2FU, VE2HQ, YB4FN, ZK9RW

3.5 MHz
GM3JDR, HA7UG, P29PR, SM6CPY, UA1DZ, UK2RDX ZK9RW

1.8 MHz
VK2DSG, VK3(2), VK5(4), VK6HD, VK7(2)

QSLs RECEIVED BY ERIC L30042

10 MHz CW
DK5GN, EI4CL, F2BS, G3AAK, HB9AMO, JA5DQH, OE9SLH OK1DWF/P, K3KA, K4SE, FK8DZ, FM7CF, FO8GM, HA7RO (3.5), HC7CM, HL5OC, IS0MVE, LU9FAN, P42E, SM7ALC (3.5), SV1NY, TI2BEV, T30CH, DJ6SI/T5, UW3BF (3.5), VK9NS (1.8), VP9HW, VU2AWL, W5RRR (NASA), ZS4U, 5W1EJ

WORKED ON THE EAST COAST

28 MHz
3D2GT, WB2SAY, XE2MX, XE2NNZ ZK2NU

21 MHz
3D2GT, BY1AA*, C6ADJ, FO8JP, HK0TU, HL0R, T2ADE, VK0RC, VK4MAL, VQ9EH, VQ9JD, WA6DJO/KH8, XU1SS, YB0BEG, ZC4YC, ZF2GE, ZS4PB.

14 MHz
3D2DM, 3V8PS, 5N8BKM, 8Q7AV, 8Q7BT, 9H4M, 9M8PW, A92DQ, BY2AA*, BY1PK, C21FS, C21RK, CE3BII, CO2HS, DF3NZ/ST2, FB8WI, FC8TT, G3XPW, GI4NKF, H44SA, HK0TU, HV2VO, I0NKN, J37AH, KA7EKC/ KL7, KC4USV, KH2BE, KP2J, KX4PO, KX6PO, LA7EU, LA8PF, LA8PF*, PY1ZAE, PY3CB, PZ1BZ, SL4ZYX*, SP9WY, SP9WY*, ST2SA, T2ADE, T2WCY, T77B, T77V, TR8CR, VE1ASU*, VE7BBC/ KH8, VK9ZS, VP8AGA, VP8ALD, VR6KB, XU1SS, Y23DG, Y24OH, Y24OH*, Y44ZIP, YI1BGD, ZK2RS.

7 MHz
3D2DM, 3V8AA, 6Y5IC, C21RK, C21RK, CE3ELS, CP8GB, CP8HD, CP8HD, CT1FL, CT2CB, EA8BH, GI3OQR, JA2BAY, KC4USV, KL7AF, KP4DEX/V2A, LU5AMF, OA4WM, T77B, TI2CF, VK2BCW/LH, VP2VD, WH2ADG, YV3BQS, YV3BQS, ZB2GR, ZK1IK, ZK1RS, ZP5PX.

3.5 MHz
JF1IST, VK9WCY

** Denotes CW operation.*

1.8 MHz
VK6HD, ZL1AAS.

SOME INTERESTING QSLs RECEIVED

BY1PK, FP8AA, G8NF/W4, HA5GP, HA5MA, HV3SJ, LA8PF, OH0KF, OH0W, OH9RW, OZ1EOE, PY1EFM/PY0T, SV1OL, WA3UHK/DU2.

THANKS

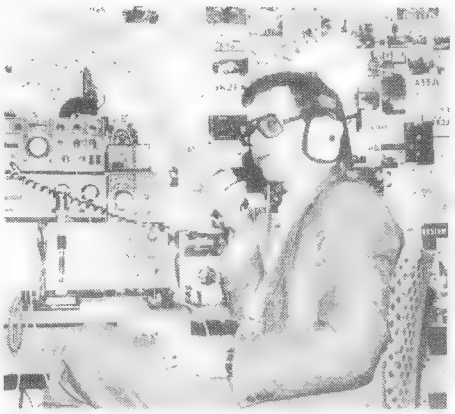
In compiling these notes, information has been gleaned from such sources as RADCOM, QSL MANAGERS LIST, WORLD RADIO, QRZ DX, VERON, DXEXPRESS, QRZ DX, DX NEWS SHEET and LONG SKIP which were used together with reports from VK's 2HD, PS, 3BY, UX, YJ, YL, 6HD, NE and SWL 30042. Amateurs from overseas countries which have contributed include AD1S, G3NBC, I8SAT, ZL1AMM and ZL1AMN. Thanks to one and all.

To all contributors and readers of this column, happy Seasons Greetings to one and all is extended from our QTH to yours, with hopes that 1984 brings health, happiness and lots of DX to one and all.

Remember that the curse of most DXers is that most have to work and miss out on some of the "goodies" that are on the bands.

AR

Faces Behind the Key and Microphone



Charlie — F6CVR.

Ruthanna WB3CQN, who is presently visiting VK, with Misti W3DOG.

THUMBNAIL SKETCHES

Peter Brown, VK4PJ
16 Bede Street, Balmoral, Qld 4171

ERIC NISSEN VK4XN
1930

Eric, who was born in 1905, sat for his AOCP at the Dalby PO in late 1929 and his Morse test was carried out by Eber Lane who subsequently became a most senior PMG executive. However Eric had been interested in amateur radio well before 1930.

Transmitting equipment comprised a Radiotron UX112A audio output type valve, ½ amp filament, in split Colpitts oscillator circuit. Plate supply was approx 135 volts from a number of old 'phone type dry cells, cases punctured and immersed in water in glass jars.

Receiver was a UV200 "soft" type valve regenerative detector with audio amplification.

Antenna a "windom" type single wire feeder, flat top 132 feet and 50 feet high.

Eric was particularly interested in 10 metres in his early days and counts XU2UU, China, among his early DX contacts.

In the late '30s Eric "invested" in a Philips 25 watt transmitting triode, and took the 220 volt anode supply from the DC town mains. Unfortunately little was known of sunspot cycles in those days and there were many disappointments on 10 metres.

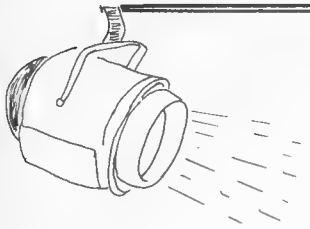
In 1929, Brisbane radio identity, Russel F Roberts donated a cup to the VK4 Division for "operating above 14 MHz". Bob Beatson (ex VK4BB), 1929, Rev Delbridge (ex VK4RJ), 1930, and A R (Mac) McKenzie (ex VK4GK) were winners before VK4XN in 1932, 1933, and 1934 who retains the cup.

Among Eric's stories is one of a Puss Moth flight from Brisbane to the Downs and back experimenting with 5 metres.

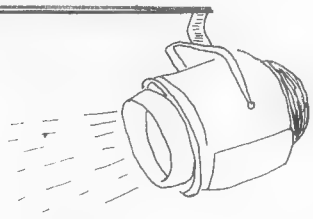
Over 31 years on the 4QS Dalby staff, from the original 10 kW then high power, until retirement in 1970 was Eric's main work life.

On retirement Eric was awarded the Imperial Service Medal. VK4XN became active in Toowoomba from 1976 with limited activity on HF bands and 2 metres.

AR



SPOTLIGHT ON SWLing



Robin Harwood, VK7RH
5 Helen Street, Launceston, Tas 7250

Well, it is the end of the year and the final month of the World Communications Year 1983. There have been several events on shortwave commemorating this, for example both Radio Netherlands and Radio HCJB mounted amateur radio stations from their studios or sites. PA6PCJ was located in the Radio Netherlands studios in Hilversum, while HC1JB was able to utilise the antenna arrays at the Ecuadorean Gospel station site at Pifo, when these were not required for their broadcasts. Unfortunately poor propagation prevented many in this area from either hearing or working them. As well, several administrations released special prefixes to the amateur service to celebrate WCY '83.

It is unfortunate that the amount of deliberate interference or jamming has markedly increased during the year. Ostensibly the celebrations have focused on communications, yet there are some signals designed to deliberately frustrate that endeavour.

As the declining sunspots have caused propagation on the higher frequencies to fall away, there has been an increasing occupancy of lower frequency allocations, with the resulting congestion only too apparent. Fortunately, some traffic is being re-routed via the communications satellites, yet developing nations have found that it is more economical to utilise HF communications.

Perhaps in 1984 we will see a possible growth in traffic and volume over shortwave frequencies. Many countries are modernising and expanding their external broadcasting outlets, wishing to communicate their views to other nations. However, it is a fact that many domestic receivers with SW capabilities, are not able to cope with the congested bands. That is why stations such as Radio Moscow dominate the bands with their super-powered senders and vast antenna arrays, drowning out the competition. Many organisations are either forced into erecting senders and arrays to punch through, or to alter their frequencies to where broadcasting is not normally heard.

Therefore, I believe that the amateur community should get behind the Intruder Watch Service and log any interloper that strays into our exclusive allocations. The amount of traffic from intruders on our bands is increasing and if we don't act and complain, we could lose them by default. Many of the intruders have considerably more power output than a normal amateur is allowed. Often they plonk down on a channel, with a form of frequency shift operation, running reversals, blanks or often an unmodulated carrier. They do this to keep the channel occupied denying it to other users. This practice by intruders, I must add, is not confined to amateur allocations.

One phenomenon that has been around for a while is Long Delayed Echoes (LDEs). Although I have been aware of them, I haven't personally come into contact with them. Basically what happens is that amateur and commercial operators hear their signals several minutes after they have ceased transmitting.

Of course, this has spawned a variety of theories ranging from time warps to UFOs. However, Robert Freyman, a former scientist with the US government at Los Alamos, has solved the riddle. He proposed that occasionally radio signals became trapped in a conductive duct of plasma, created by the solar wind. This duct extends to the Troposphere, where it "blends" with the Earth's geo-magnetic field. Any radio signals in this region enter the duct. This is determined on the ALF and MUF, and signals are usually propagated into space towards the sun. However, if this duct collapses, the RF signal is reflected back to earth and is heard again, often after a considerable delay.

Scientists at the Soviet Polar Geophysical Institute have researched this theory with experiments and have confirmed that this is in fact what causes the LDEs. This phenomenon is quite common on signals from polar regions, where the earth's magnetic field and the solar wind blend most efficiently. Naturally, because of the USSR's geographic location, signals are subject to LDEs. Mr Freyman was awarded the Commemorative Medal of the Soviet Polar Geophysical Institute for his discovery. No doubt, the OTHR pulses helped the scientists confirm the theory of LDEs.

Only a few months ago, one Melbourne DXer was wondering if there was a correlation between exceptional MW propagation he was observing, and the sightings in central and eastern Victoria of UFOs. However, it is more likely that there is some ionospheric ducting similar to LDEs causing this, rather than the "little green men". This ionospheric ducting could also explain why some UFOs are tracked on radar.

Well, Radio Australia, the overseas service of the ABC has done some programme re-organisation, according to Media Network on Radio Netherlands. They are reportedly dropping transmission to Europe and North America and concentrating instead on the Asian/Pacific region. Their weekly communications magazine — "Spectrum" has been replaced by "Talk-Back" which will continue with more DX information similar to what "Spectrum" had, but with more input from overseas. You can hear it at 1610 UTC Saturdays repeated at 0210 and 0730 Sundays.

Also the ABC Domestic Shortwave Station in Sydney — VLI — on 6.090 MHz, ceased operations as from Saturday 8th October. It is unlikely to reappear for some time as it was becoming increasingly difficult to procure spare parts for the ageing transmitter. I believe that two regional shortwave transmitters in the Northern Territory will be operational sometime in 1984. With VLI now departed, many SWLs are able to copy the 300 kW transmitter of Radio Luxembourg. I believe that it is in English during the European night time in parallel to their MW outlet, but the majority of programming I hear is in Dutch.

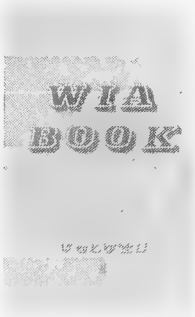
The weekly Southern Cross DX Club net is now heard an hour earlier at 1030 UTC on approx 3.570 MHz each Thursday. The reason being we have decided to keep the net on local time, as it was getting late at 1130 when we are on Daylight Saving Time. This year, only Queensland and the Northern Territory are remaining on Standard Time, as WA is going to try Daylight Saving again. The net will revert to 1130 UTC as from March.

Well, it only remains for me to wish everyone the compliments of the Season and I hope that you have good listening during 1984.

Robin, VK7RH

NOW AVAILABLE

WIA BOOK VOL 1



Contains a wealth of historical information and photographs of early "wireless" days and approximately eighty pages of VHF projects to build.

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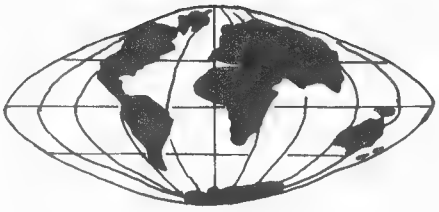
VHF UHF - an expanding world

Eric Jamieson, VK5LP
1 Quinns Road, Forreston, SA 5233



All times are Universal Co-ordinated Time, indicated as UTC

AMATEUR BAND BEACONS

FREQ	*CALLSIGN*	*LOCATION*
50.005	H44HIR	Honiara
50.008	JA2IGY	Mie
50.020	GB3SIX	Anglesey
50.060	KH6EQI	Pearl Harbour
50.075	VS6SIX	Hong Kong
50.945	ZS1SIX	South Africa
51.020	ZL1UHF	Auckland
52.013	P29SIX	New Guinea
52.200	VK8VF	Darwin
52.250	ZL2VHP	Palmerston North
52.300	VK6RTV	Perth
52.320	VK6RTT	Carnarvon
52.350	VK6RTU	Kalgoorlie
52.370	VK7RST	Hobart
52.420	VK2RSY	Sydney
52.425	VK2RGB	Gunnedah
52.435	VK3RMV	Hamilton
52.440	VK4RTL	Townsville
52.470	VK7RNT	Launceston
52.510	ZL2MHF	Mount Climie
144.019	VK6RBS	Busselton
144.400	VK4RTT	Mount Mowbullan
144.420	VK2RSY	Sydney
144.465	VK6RTW	Albany
144.475	VK1RTA	Canberra
144.480	VK8VF	Darwin
144.550	VK5RSE	Mount Gambier
144.600	VK6RTT	Carnarvon
145.000	VK6RTV	Perth
147.400	VK2RCW	Sydney
432.057	VK6RBS	Busselton
432.410	VK6RTT	Carnarvon
432.420	VK6RSY	Sydney
432.425	VK3RMB	Mount Bunninyong
432.440	VK4RBB	Brisbane
1296.171	VK6RBS	Busselton

There are no listed beacon changes this month, although there will be a callsign change in the near future to the Macquarie Island beacon. More on this later. Three new beacons are listed in VK6 — see text for details.

TWO METRES AND ABOVE

It has been very pleasing of recent times to be continuing to receive detailed reports of what has been happening on 144 MHz and above in New South Wales, and this month an indication of what has been happening in Victoria.

Gordon VK2ZAB has sent along another letter outlining contacts from the Sydney area to various locations throughout NSW. He reports:

"The most interesting happening was the tropospheric refraction opening on 2 metres which occurred on 19th September. (Local day.)

"Bob VK1ZQR advised me at 2245 that there appeared to be an opening to VK5 and then promptly worked Col VK5RO in Woodville, an Adelaide suburb. I (VK2ZAB) made contact with Col a little later and at 2258 he was 5x2 in Sydney, and I received Q3-5, S2-4. During the contact with Col, Peter VK3XDP in Bendigo called and was 5x3 in Sydney giving me 5x5 in Bendigo.

"The opening continued throughout the day and evening and although some unusual repeater openings were heard there were no further real contacts made to VK5 or VK3 from Sydney. I understand from the VK1 gang that VK5ZO in Mt Barker was heard in Canberra but I am not sure whether a contact was actually made.

"There are two new stations on 2 metres in Canberra, Peter VK3ZQS who is operating portable pending receipt of his VK1 call and Ian VK1BQ who puts a good signal into Sydney on both 2 metres and 70 cm, with 100 watts PEP and 10 watts PEP respectively.

"Two metre contacts with Doug VK3UM at Chirnside Park (Melbourne) have been continued throughout the month. The scheduled attempts at 2230 and 2245 each Saturday and Sunday (local days) on 144.200 MHz have resulted in contacts being made every weekend during September. Participating stations have included Brian VK2QP (formerly VK2ZHT) and myself in Sydney, with VK1RK, VK1KAA and VK1VP in Canberra.

"Particularly interesting was the contact on 23/9 at 2235. Doug was good copy here for 27 minutes and tried 70 cm. His 80 watt PEP signal was heard here in Sydney by myself and Brian VK2QP for a short time on two occasions so it is now only a matter of time before the first 432 MHz SSB contact is made between Melbourne and Sydney.

"VK2YEZ in Griffith can be heard in Sydney any time he transmits with his beam in this direction. John has also continued his 70 cm contacts into Melbourne. He has 150 watts PEP on 70 cm and has so far worked Doug VK3UM.

"Jeff VK2EJJ is another station south west of Sydney at Wagga who can be worked from Sydney at almost any time. Sometimes Jeff is limited to 10 watts but still makes it.

"John VK2ZQX in Gunnedah, Don VK2ADY in Tamworth, Doug VK2XDH in Uralla have all been active on 2 metres during September and can be heard in Sydney on 144.2 at 1030 almost any week night. Les VK2DSG at Duri also puts in an appearance on 2 m SSB after a long absence. He was 5x4 in Sydney at 1047 on 22/9."

Thanks for keeping us informed of your contacts Gordon, by doing so must lead to more eventual contacts as people realise there are stations to be worked on a regular basis.

THE MELBOURNE SCENE

After a long written absence I have received a massive epistle from Doug VK3UM at Chirnside Park, a Melbourne suburb, giving details of happenings in that area, and written whilst travelling on the train to work! I have extracted the relevant items of interest to readers, quite a lot being for my personal reading!

On the equipment side Doug says he came back to VHF operating after his sojourn some years ago in VK8, as the result of an occasion when Bob VK4XV scoffed at the fact that he would be able to hear VK3UM on 2 metres meteor scatter. The challenge was sealed naturally when "a couple of dozen" was laid on the line!

Doug writes: *"It so happens that on our first sked on 144.020 that we bumped into Eddie VK1VP and Bill VK4LC who had been doing the same thing for months on 144.015. Needless to say, by getting together we all started to hear each other although from Eddie to me was as expected, too close. Many half contacts were had between VK4LC, Angus VK4KAG and myself when we came to meet Gordon VK2ZAB. Bill was consistently hearing Gordon for minutes on end and on what I strongly believe was 'aircraft enhancement!'.*

"To cut a long story short, I finally arranged with Gordon to look towards Melbourne. Calculation indicated that with the systems gains at the time that +3 dB forward scatter signals were possible. On our first attempt this was proved correct and although not a full QSO I was able to hear Gordon for 90% of the time and read him Q5 for 10% of the time. My antenna then consisted of two 10 element beams. Next followed replacing the RG214 with heliax and fine tuning the preamps until I was able to realise an 0.8 dB NF (on the HP automatic noise measuring device). This resulted in the first of many Sydney/Melbourne QSOs and the meteor scatter skeds were dropped in favour of a concentrated approach to forward scatter.

"Four ATN 13 element yagis were next tried, spaced 16 feet horizontally and 14½ feet virtically, with open wire phasing sections. This wire was abandoned as it could not be kept tight, so settled for a linear balun on each antenna and a 4 to 1 coaxial power divider. This set up gave great results and the Sydney/Melbourne path became easy. Forward scatter reports received from as far north as Narribri (1000 km).

"Because the tower was also needed for other antenna commitments, the four came down and were replaced with two 13 elements. But the four had a gain of almost 20 dB with classic side lobes at -14 dB and front to back 35 dB. Sun noise on a quiet sun was up to 9 dB. Having two unused 13 elements on the ground was irksome, so after some further thought it looked as though they might be placed in a four way configuration straddling the TH6 already in place! They were deliberately overcoupled to reduce the side lobes and finished up with 10½ feet vertical, so that now the four are again giving almost 20 dB of forward gain with a slightly wider

front lobe without side lobes. The 3 dB points are about ± 5° which raises the old point that a high gain antenna can only be used if you know where and at what time to point the thing! Also, with 300 watts PEP out the ERP is sufficient to cause considerable RFI starting some ¼ mile from the array. Even 10 watts makes a lot of noise!! As a result of this problem, evening skeds were abandoned largely in preference to Saturday and Sunday mornings, with interesting if not predictable results."

THE VAGARIES OF PROPAGATION

Doug continues: *"We became interested in the propagation modes encountered. When you reach a situation of high gain antenna, very low noise front ends and a fair bit of sting, not forgetting reliable guys at the other end with similar setups many things begin to happen that are not all explained in the 'best books'.*

"Forward scatter follows the predicted computations that Sydney/Melbourne (distance) will provide signals twenty four hours a day with station system gains as described, but there are many times when there is not a trace of any signal. It is therefore surmised that signals were scattered upwards at times.

"Aircraft enhancement. Here Gordon and I agree to disagree that this provides our basis for the regular (ho hum) contacts. This is our continuing theme for 'research' at this time. But what is certain is the enhancement that does occur. Typically signals (on the noise floor) will rise rapidly over a thirty second period without flutter, and provide signal levels of up to 24 dB on the Sydney path and over 50 dB on the Canberra path for periods approaching five and ten minutes respectively, viz: Gordon can be Q5 S1 which increases to S5 for five minutes, while Canberra is inaudible normally, but signals have been seen to S9 +20 dB (normally S7) for up to ten minutes. Signals disappear as rapidly as they appear. Many times they are disguised by following flights and run into each other. It is not unknown for up to half an hour of continuous enhancement to occur.

"Signals are characteristically steady (viz: no flutter) with generally slow but not deep QSB. When you think about it the cross town aircraft flutter most people know would not be present at these distances so a single signal path will predominate. What causes it? I believe there are three possibilities: (1) Reflection off the condensation trails left by aircraft; (2) Reflection caused by the temperature sheer effect caused by the heat from the aircraft engines; (3) Reflection from the surface of the aircraft. In short, I favour (3) but as mentioned earlier Gordon is not convinced but rather feels another mechanism is responsible. We are both working towards trying to establish what and why or how, and time only will tell."

INTERESTING SIDELIGHTS

"Try this one. During the widespread opening you reported a couple of months ago, the band was open to Mick VK5ZDR all day on the Saturday, and at 7 PM local I worked Launceston, but the beam heading was 035° and signals S9 +20 dB and the direct path S7!! Definite reflection media which I have never encountered before or since. At the same time Garry VK3ZHP reported working VK7 on 70 cm on the same heading only on that band the direct path was stronger! Les VK3ZBJ found the same conditions.

"Another interesting 'effect' noticed on odd occasions with Gordon VK2ZAB's signal is a hollow sound, almost to the point of an echo. Queer and unexplained.

"Sun noise is also a problem on early morning skeds and limits the noise floor (which thankfully is either hopeless or excellent with the latter predominating). As most experienced 2 metre operators have found, sun noise can, for short periods (even when elevated well above the horizon) reach S9 proportions.

"The VK5RSE beacon. Generally, Les VK3ZBJ and myself (VK3UM) can always detect the signal but for most others it takes tropo enhancement for them to hear it. I use it for beam alignment and roughly checking meteor counts."

OSCAR 10

Further from Doug: *"Last month installed 'the telephone' (viz: Oscar 10) and what a boon for getting just what is going on around the world and for the setting up of skeds. We have set up 145.960 (down link) as a VK VHF/UHF calling frequency and the group is expanding. Has already proved its worth.*

"For Oscar 10 I put up 2 x 16 el on 432 and 2 x 10 el on 145, the former fed with heliax, and run up to 100 watts output and use the system for terrestrial purposes. All antenna horizontal on an AZ/EL mount. Front end is not too bad as I can consistently get about 9 dB of sun noise on 432."

SKED TIMES AND PROCEDURES

"Gordon VK2ZAB and I (VK3UM) schedule on 144.200. This was chosen to be the best compromise re Ch 5A, beacons etc. Times are 0830 to 0900 EST (2230 to 2300 UTC) with time extended if necessary on each Saturday and Sunday.

"Gordon calls for the first thirty seconds of each minute and I for the last thirty seconds. When contact is established we work normally. We both break to allow for all who can copy to have a go. All overs are kept brief (viz: fifteen seconds) so please, anybody joining in don't give us your rig and family history or the band will have expired!! Another thing, if hearing meteor pings please call by giving your callsign only, (we know ours!!) for it is very frustrating to hear your call six times at S9 without hearing who it is!

"Gordon and I have had Q5 QSOs on each occasion we have had schedules over the past 2½ months (including some evenings) with rare exceptions where I have been Q3. (Power difference). I have now worked five different Sydney stations which is fun considering it had never been done before (going back 5 months).

"As Gordon says, its the forward scatter mode that's more interesting than the 'flash tropo' enhancements. This is always present regardless of 'conditions'. Plenty of guys are improving their systems at present and an 'expanding world' of VHF is resulting. As a well known Frankston station has been heard to say on many occasions 'it's no good having a big mouth but wax in your ears!!'. It still amazes me that people go out and buy 40-100 watt amplifers for 432, feed it to their 4 by X element array via RG8 and ponder why the band is not open! The economics of the amplifier cost versus that of buying heliax would put them well in front with their existing rigs." (Couldn't agree more Doug . . . 5LP.)

MELBOURNE ACTIVITY

"On the serious side of things there isn't much at present. Mainly Les VK3ZBJ, Garry VK3ZHP and VK3UM, although many appear out of the woodwork on a good opening. Hopefully some may be inspired to give it a bash but it's the same old thing — 'bands are only open during summer and the shacks are shut in winter'."

Thanks for the comprehensive fill in of your activities Doug. I have quoted from your pages of some length as the material is relevant and interesting. Maybe some will be inspired to improve their systems and give it a go. I personally can vouch for the considerable improvements to the ears at the 5LP establishment on 2 metres when the GasFET preamp was added to the 2 x 13 elements at eighty six feet!! And I wouldn't hear much on 432 if it wasn't for the heliax coming from the antenna!

MULTI-BAND BEACONS IN WA

Wally VK6KZ has written advising of the installation of a new multi-band beacon at Busselton, south of Perth, on 8th October, and operating since 0630 UTC that day. Frequencies are: 144.019 MHz (zero beat, key down); 432.057 MHz and 1296.171 MHz.

"As you can note, these are harmonically related, and the system comprises a common 144.019 MHz drive source. A 72 MHz crystal is used and this is frequency shift keyed. About 40 watts at 144 MHz is fed from the transmitter to a box mounted on the tower adjacent to the antennas. The 23 watts of 144 MHz signal is fed through the first power divider with approximately 10 watts fed to two 5 element horizontally polarised yagis. One yagi is pointed at Perth (014°) and the other to Adelaide at 100°.

"The other half of the power goes to a varactor multiplier to produce 432 MHz. A second power divider sends power to the 432 MHz antenna and power to a 1296 MHz varactor tripler. The 432 MHz array is a screen reflector with three lobes favouring Adelaide, Bunbury and Perth. The system efficiency is such that less than ½ a watt is available on 1296 MHz but at least there is only one metre of coax run to the antenna!

"The frequencies were chosen to avoid the EME schedules on 432 MHz and to give reasonable frequencies in the 144 and 1296 MHz bands. The frequencies conform with the WIA Band Plan in that they were chosen because of the special circumstances of this beacon(s).

"Already there have been reports of almost continuous twenty four hour a day reception of the 144 MHz beacon in Albany, Perth and Watheroo (200 km north of Perth and 400 km north of Busselton). The 432 and 1296 MHz beacons were heard in Perth for over two hours the day after they were installed and the 432 beacon has been heard periodically yesterday and this morning (10th October and 11th October). It will be interesting to see how reliable the path is to Perth (and elsewhere) on the higher frequencies.

"The beacon is operated by the WA VHF

Group (and paid for by it) with the help of the Geographe Radio and Electronics Group of Busselton who have it at their meeting place/radio shack.

"Construction was a team effort with Don Graham VK6HK, Barry Grey VK6ZSB, John Lehmann VK6ZK, Bob Blianco VK6KRC and myself VK6KZ being most involved. A modular design was chosen to provide flexibility and easy maintenance or repair. Shortly a 432/1296 MHz beacon should be installed in Perth and once sites can be finalised there are plans for 144 MHz beacons at Exmouth and Norseman."

ACTIVITY IN WA

"The Manjimup (Max VK6FN) to Watheroo (Peter VK6ZPG) path of 400 km on 144 MHz continues to be very dependable with Bob VK6KRC in Perth in the centre and very active. This is an almost nightly sked with those three. John VK6ZK and Ron VK6FM in Perth continue checking 144 MHz propagation to Wally VK6WG in Albany. Last week Steve VK6ASF (Exmouth) was worked via the Geraldton repeater and he indicated Indonesian 2 metre signals were coming in at that time. There were no signs of Steve direct on 144 MHz in Perth but Denis VK6LD 200 km south of Perth was able to work Steve direct on 144 MHz SSB with Steve using two x 5/8 wavelength vertical antenna! People from Bunbury, 470 km south of Geraldton were also able to work Steve in Exmouth via the Geraldton repeater. Roll on summer!

"Don Graham VK6HK and I have pushed our 3.5 GHz working to 80 km and look forward to trying the ducting possibilities when they occur. I understand the 10 GHz beacon in Perth is still running well. Activity on that band has fallen since Roger Nottage VK6NR left for Tasmania.

"Wednesday morning 12th October: We have had at least six hours of 432 and 1296 MHz reception of the beacons from 0900 to 1500 UTC."

Thanks Wally for that latest information, and your new beacons have been added to the beacon list. I hope anyone hearing them will advise Wally as even 2 metre signals don't come too easily from the far west coast of WA.

MOBILE VK6RO/M ON HOLIDAYS

Graham VK6RO has once again headed north with his 6 metre equipment and had a good time working JAs, 150 of them on 50 MHz and all from the mobile IC505 and 10 watts output to a quarter wave mobile whip on the roof of the car. There were a total of ten openings starting from 25th August at Carnarvon with one JA at 1027 UTC.

On 26th August at Carnarvon one opening 0700 to 0913 working thirty five JAs. 27th August: Dampier, one opening 0623 to 0820 and nine JAs. 28th August: TV on 49.750 at 0920 and 1130 at Dampier. 29th August: 49.750 TV again at Dampier at 0505 and 0710. 30th August: JA2IGY beacon 5x1 at 0740, with TV on 49.750, at Port Hedland. 31st August: Port Hedland, two openings, 0750-0830 and 0945-1040 with thirty six JAs worked.

1st September: At Dampier, one opening 0836 to 1028 with six JAs. 2nd September: Two openings at Dampier, 0724 to 0823 and 1042 to 1319 with forty JAs. 3rd September: TV on 49.750 0800 and 1000 at Dampier. 4th September: Two openings 0711 to 0735 and 1006 to 1225 and twenty three JAs worked. 5th September: Dampier TV on 49.750 at 0526 and 0803. 6th September: Carnarvon, TV on 49.750 at 0655.

Graham noted the following: *"On 26th August JAs were 5x9+ on 50 MHz in QSOs but JAs not hearing VK6RTT beacon only 3 km away on 52.320 MHz. This also happened at other times.*

"In many of the day-time openings the MUF probably only reached 50.300 MHz and it certainly never got to 52 MHz.

"Only two night-time TEP openings, on 2nd September and 4th September.

"The difference between 50 and 52 MHz was outstanding. I only heard one JA on 52 MHz and none were worked there. Last year I worked eighty six JAs, this year 150, mainly due to the use of 50 MHz.

"I have now worked 953 JAs while mobile on four holidays in the north-west of VK6 during 1980, 1981, 1982 and 1983, and all worked with 10 to 20 watts output and quarter wave whip."

That's a good effort Graham and thanks for writing. It will be interesting to see what happens over the next few years with the sunspot cycle at a low point, and any comparisons which can be made on 50 and 52 MHz. If you continue to make trips to the north I would expect you to be able to draw some conclusions!

NEW ZEALAND VHF FIELD DAY

Readers are reminded of the annual VHF to SHF Field Day being held in New Zealand on 3rd and 4th December. On Saturday 3rd December the field day operates from 0500 to 1100 and Sunday 4th December from 2100 to 0300 UTC and all bands from 6 metres up will be included. It may well be worth while turning your beams in their direction for possible contacts, particularly if you live in the Eastern States.

SIX METRES COUNTRIES LIST

It is proposed to have the first listing of countries worked by Australian amateurs in the February 1984 issue of "Amateur Radio". It was decided to not print the list in January because the closing date for copy in Melbourne is 18th November and the consequent problems associated with production over the Christmas holiday period. Therefore, you have one last chance now to upgrade your former list if you have already submitted it to me, or to send your list if you haven't already done so. The method of sending information was published last month and must follow this format. Those lists already to hand include some very good tallies. It is important that any list for inclusion be in my hands no later than 23rd December, after that date I cannot guarantee inclusion this time.

MACQUARIE ISLAND

The operation by Peter McLennan VK0AP has now ended. The equipment however has been handed over to David Rasch VK0CK. David's home callsign is VK5CK.

A new EPROM for the keyer with David's call of VK0CK has been provided.

David has also taken his own TS660 with him.

The equipment on loan is courtesy of Lionel VK3NM who provided the major items and Gil VK3AUI. The major items are an FT680, a Lunar 100 watt amplifier and a Werner Wulf beam.

The keyer may shift to 52.150 MHz and readers will be advised when operation has commenced.

Those who have still to work this rare six metre country have another year of operation.

GENERAL NEWS

The summer DX season is almost upon us and we will probably see an increase in Es activity and number of days for openings whilst in the low part of the sunspot cycle. And don't overlook 2 metres during periods of high Es activity, especially when short skip is around. Two metre openings if any, will probably be only of short duration, so don't waste time talking about yourself or equipment, get the signal reports over and go looking for someone else, so giving as many as possible to share in these unique openings.

This issue starts my fifteenth year of writing these notes. I thank all my faithful correspondents who by their input make the pages possible. The content may not suit everyone, but there are obviously plenty of people out there who do get something from the notes judging by the nice letters I receive. Thanks everyone, I do the best I can for you and for the art of VHF, but much of any success the column may enjoy directly relates to the input which you, the reader, gives it by your letters setting out your exploits and that of others on the VHF bands.

One continuing compounding problem for me as your Sub-Editor is the fact that I still need to work to keep the wolf from the door, and my work as a television technician is very demanding on hours which are frequently very long and hence I run into problems with time to do all that I would like. Hence, I often have long periods without being able to even get on the air which grieves me. Hopefully, this will all change before too long as I propose retiring at the end of 1984 and this should give me time to improve the input to the column if for no other reason that I should be able to fire up the gear more often. I would dearly like to be involved in the scatter work that Gordon VK2ZAB and Doug VK3UM and others are presently conducting, and from 1985 onwards I will be available for specialised work in this field, I already have the equipment capability but not the time to use it!

I take this opportunity of extending Seasons Greetings to all my readers and hope you can work plenty of DX. May Father Christmas be kind and present you with that much longed for transceiver or other piece of equipment, and that it will not cost you a fur coat or new dishwasher for the XYL as well! My thanks to the Editor of "Amateur Radio" and others associated with its publication for bearing with me all these years, and having to put up with my typewritten copy for so long! I must say however, that the treatment given me by the Editor and his staff has always been very generous and there have been very few items submitted which have not been printed, so we must have some mutual understanding!

Closing with the thought for the month: "The reason so many politicians stand on their records is that they are afraid somebody might read them!" 73. The Voice in the Hills.

AR

ALARA

Australian Ladies Amateur Radio Association

Margaret Loft, VK3DML
28 Lawrence Street, Castlemaine, Vic 3450

Well another year is nearly over and for ALARA it has been a very eventful one. In July our AGM was a success with all executive positions filled.

In August we celebrated our eighth birthday and plans are progressing well for our first get-together at Mildura in September, 1984. Quite a lot of interest has been shown and hopefully it will be well attended.

Our membership is increasing monthly and we are always pleased to hear from new YLs on air and hope they will join our group. Welcome to new members:— Alice XYL of VK3PEC on 9th October, 1983 and to Lois WB3EFQ on 19th October, 1983 who was sponsored by Gwen VK3DYL. Welcome to Australia to Siegi VK4VSF formerly P29NSF, a member of ALARA for some time.

WCY; some of our members were involved in activities for WCY through their zones and clubs and also a couple of magazine articles have helped to publicise the women's involvement in amateur radio.

1983 has seen a number of women moving forward into more prominent roles in the WIA and this is an encouraging sign that we are being accepted into what was for many years a mainly male domain. Two of our members are now federal councillors and several are now office bearers at zone levels.

ALARA's Contest No 3 will be over when you read this and again I say thank you to all who participated and remind you to please send your log in by 31st December, 1983. Remember this is the first year to be counted for the *Five Year Trophy* so get your log in to me so you are eligible for it.

MEMORIAL TROPHY

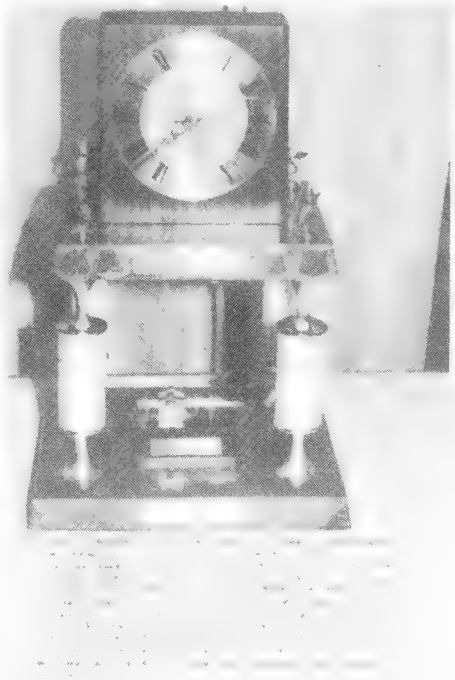
The Townsville Amateur Radio Club has provided a magnificent trophy to commemorate the memory of Mrs Constance McKenzie OBE, formerly VK2FV, the first licensed YL and woman member of WIA. Mrs Mac is well known for her teaching of Morse code to over 10 000 servicemen during WW2.

ALARA feels very honoured to be offered this trophy for a CW section of their contest and the committee is at present working on how best we can incorporate this trophy into our contest next year. Watch this column for details. Our thanks to Mr Bill Woodger and the Townsville ARC.

ALARA's weekly net for the Daylight Saving Time period is at 1000 UTC this hopefully will suit more people and the new net frequency is 3.580 MHz ± QRM.

Congratulations to member Joy VK2EBX, who in June this year learned she had won the Bronze Swagman Award for Bush Verse for 1983 out of 500 entries. Joy and family travelled to Winton Qld for the presentation (see photo). The competition is held every year to promote the writing of Australian bush verse after the style of Henry Lawson and Banjo Patterson. A very talented lady who has won other prizes for her "scribbling" (Joy's words) and this is certainly a delight to read.

Visit to "down under" is anticipated by Ruthanna WB3CQN in late November early December. Mavis VK3BIR is arranging a busy day on 10th December which will give some of the YLs a chance to meet Ruthanna.



I would like to take this opportunity to thank all members of ALARA for your support and news for this column, so very necessary to keep the interest in us alive and well.

ALARA wishes all our readers a very happy and joyous festive season and may 1984 be all you would wish for yourself and families.

Until next year drive safety and I look forward to another year with you all.

33/73/88 Margaret, VK3DML

"GREEN GINGER NIP" by Joy Collis, VK2EBX

The heat was oppressive, the blowflies hummed loud,
The whirly-winds blew up the dust;
And the plane that the young outback minister flew
Was the colour of reddish-brown rust.

Three Sundays the little church out in the bush
With the earth and the sky slept in union,
But the fourth Sunday woke with a bustle and stir
For the once-a-month Holy Communion.

The minister, earnest and solemn of face,
His sermon rehearsed and amended;
Flew the battered old plane o'er the featureless plain
As the morning sun slowly ascended.

He bumpily landed, and bounced to a halt
On the runway 'twas hard to define!
As he stepped from the plane he was gripped by a thought!
He'd forgot the Communion wine!!

The people awaited in chattering groups,
While children played noisily round,
As the parson approached, and without more ado
His dilemma began to expound.

A young lad came forward, a freckle-faced kid;
"Please sir, my dad's got some home brew.
We live just a little way off from the church,
I could go get a bottle for you."

"Why, thank you, young Tom, that is really most kind."
Off he went at a pretty fast clip;
And returned very quickly with, clutched in his hand,
A bottle of green ginger nip.

The service proceeded. The wine, duly blessed,
Was passed round the small congregation,
But the potency of that nefarious nip
Was the subject of much speculation!

For 'twas said of that brew that a thimble or two
Would lay an ox out in his stable;
So proceedings took on a more boisterous note
As the cup was returned to the table.

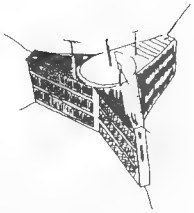
The last hymn was warbled with much voice and pep,
Though some reached "Amen" far too soon.
With some of the singers a bit out of step
And most of them quite out of tune!

The organist's playing, so slow and sedate,
Took on a more rollicking beat,
As, the blessing pronounced, the people arose,
To emerge once again in the heat.

The bottle of Communion "nip" had been large,
The number of celebrants small.
The minister sighed as he picked up the cup —
"Tis my duty to finish it all!"

'Twas late when the little plane started it's run,
And shakily climbed in the blue,
And that minister cannot recall to this day
How he sat in the cockpit and flew!

And he still flies his plane in the heat or the rain,
But one thing he'll always opine —
The first thing he always packs into his bag
Is the Holy Communion wine! **AR**



AMSAT AUSTRALIA

Colin Hurst, VK5HI
8 Arndell Road, Salisbury Park, SA 5109

NATIONAL CO-ORDINATOR
Graham Ratcliff, VK5AGR

INFORMATION NETS
AMSAT AUSTRALIA
Control: VK5AGR
Amateur Checkin. 0945 UTC Sunday
Bulletin Commences: 1000 UTC
Winter 3.680 MHz
Summer: 7.064 MHz

AMSAT PACIFIC
Control. JA1ANG
1100 UTC Sunday, 14 035 MHz

AMSAT SW PACIFIC
Control. W6CG
2200 UTC Saturday, 21.280 MHz

Participating stations and listeners are able to obtain basic orbital data including Keplerian elements from the AMSAT Australia net. This information is also included in some WIA Divisional Broadcasts.

ACKNOWLEDGEMENTS

Contributions this month are from Bob VK3ZBB, Ron VK5AKJ, AMSAT Telemail and the UoSAT Bulletin

OPERATING REPORTS

Ron VK5AKJ and Tom VK5ATA have reported the reception of garbled telemetry from OSCAR 8. It does appear therefore that whilst in periods of sunlight sufficient power is being developed by the solar cells to produce this intermittent operation of the beacon. Ron and Tom are also extremely active on the RS Series and report that there is still a dedicated group of Mode A operators getting the true feel of satellite working prior to tackling Mode B and. or Mode L. OSCAR 9 continues to function excellently with considerable interest centred on the results that HB9RJV and HB9RKR have achieved with the CCD camera experiment. From the picture taken on 21st September, 1983 they have constructed a mosaic using their colour computers and believe that the Sea of Marmara and Istanbul are featured. The 1200 Baud telemetry channel continues to provide a wealth of information either as telemetry or bulletin. OSCAR 10 Mode B operation is becoming increasingly popular and as each day goes by, another "new" country appears on the "bird" which attracts the QRM that one comes to expect on 20 metres during the CQ World Wide DX Contest. QRP days on Mondays and Wednesdays continue to highlight the fact that high uplink powers are not paramount for effective communication. Uplink powers of much less than the QRP maximum 100 watts EIRP are proving most effective. Listening around the passband it does appear that the limiting factor is the ability of operators to HEAR the downlink signals. *How about you?* OSCAR 10 Mode L is at this stage proving to be difficult to access unless an uplink power of at least 10 kilowatts EIRP is used. There does appear to be a faulty antenna relay on board the transponder, however, the designers are confident that with time the relay may lose the 10 dB of attenuation currently in the system. Notwithstanding there are operators who can muster that magnitude of power and communicate. Reg VK5QR is the only Australian amateur to QSO through Mode L at this time.

UoSAT-B

As reported in last month's column a launch has become available for low altitude orbit and the University of Surrey has submitted a proposal to accept that launch. This month we have a description of the system experiments and an update on the status of preparations.

SPACECRAFT SYSTEMS EXPERIMENTS

The UoSat-B spacecraft will carry a number of systems experiments alongside the scientific experiments described in last month's column. These system experiments are concerned with developing an improved, cost-effective spacecraft bus and experiment support facility for future amateur low-earth orbit missions — with special emphasis on low-cost Get-Away-Special (GAS payloads on the Shuttle).

1) NAVIGATION, ATTITUDE CONTROL AND STABILISATION

A low-cost medium performance stabilisation system is an essential feature for most low earth orbit secondary or GAS payloads. The stabilisation mechanisms most suited to these requirements appear to use spin, magnetic and gravity gradient techniques as none of these need employ expendable spacecraft resources for their long term operation. The UoSAT-1 mission was primarily intended to be earth-pointing utilising gravity gradient methods after an initial inertial, spin stabilised period — the necessary attitude manoeuvres being effected by on-board magnetorquers. The very simple navigation instrumentation and single-axis magnetorquer on UoSAT-1 performed well, if with some difficulty due to their simple nature. The spacecraft was spin stabilised and successful magnetic attitude manoeuvres demonstrated complete control over the spacecraft dynamics and placed it in the correct attitude for gravity gradient stabilisation. The stabilising boom, however, was prevented from deploying fully due to a snag of the cables feeding the scientific magnetometer within the tip-mass on the far end of the boom. Even with only a short (1 m) deployment of the boom, the spacecraft was successfully gravity gradient stabilised for a few days with marginal stability after which it was returned to its spin stabilised state. The experiments carried out with UoSAT-1 demonstrated the basic feasibility of a low-cost attitude control and earth-pointing stabilisation system, however, the simplicity of the navigation sensors and the partial deployment of the boom prevented the study and evaluation of the operational performance of the system. It is proposed, therefore, to include improved navigation sensors (eg: sun angle sensors, earth horizon sensors, improved navigation magnetometer) on UoSAT-B in addition to spin-axis and spin-plane magnetorquers and a reliable boom. This combination will enable the spacecraft to be navigated to an expected accuracy of within +1 degree and a combination of passive nutation dampers and active magnetic damping (using the on-board computer) will contain the nutation and libration of the spacecraft of within an expected +2 degrees.

2) COMPUTER HARDWARE, SOFTWARE AND MEMORY TECHNOLOGY

On-board memory storage has been a perennial requirement for spacecraft and is now highlighted by the proposed Packet Radio Communications Satellite (PACSAT) being studied by AMSAT. Large amounts of solid-state memory (as opposed to tape recorders) is becoming increasingly attractive, however, little experience has been gathered as to the performance of many of these devices in a long-term space environment. As these devices represent the core of a PACSAT type spacecraft, the UoSAT-B mission will provide essential data. In conjunction with the Packet Communications Experiment, various types of CMOS static and dynamic memory devices and a CMOS NSC800 microprocessor will be flown to assess their performance. An RCA 1802 microcomputer will be employed as the main spacecraft computer, as on UoSAT-1. The basic architecture will be unchanged and additional peripheral interfaces will be added to support the UoSAT-B experiments. Software and data will be loaded from the ground command stations into the spacecraft computers as necessary.

3) TELEMETRY SYSTEM

The telemetry system used on UoSAT-1 will be upgraded with the addition of an optical hardware-generated checksum for each channel. The ambiguous format of the digital status channels will be resolved by adding 'channel numbers' to each block in the same format as the current analogue channels. An improved dwell facility will allow selection of a number of channels for repeated display. In order to make space for these facilities, the RTTY, 110 Baud ASCII and CW downlink formats will be removed, although some of these can be output through the 1802 computer.

4) COMMUNICATION SYSTEMS

The simple and effective transmission formats adopted for UoSAT-1 have proved

highly successful for reception by low-cost groundstations but suffer from certain limitations at low signal levels and in noisy environments. It is proposed to experiment with error-resilient coding techniques and other transmission methods (whilst remaining simple and cheap to receive) — eg: PSK. The currently proposed PSK modulator will have facilities for 9600 Baud data transmissions. The 2.4 GHz experimental beacon on UoSAT-1 has generated great interest amongst radio amateurs and has proved a viable data downlink. It is proposed to provide a 2.4 GHz engineering downlink from UoSAT-B carrying telemetry and experiment data. Once UoSAT-B has been stabilised and commissioned, one uplink will be made available to radio amateurs for general access to the digital Packet Communications Experiment, in order that the effectiveness of the on-board traffic control software can be studied in addition to the hardware in preparation for future PACSAT missions.

UoSAT-B SPACECRAFT STATUS — UPDATE 12TH OCTOBER, 1983

No confirmation of flight has yet been received from NASA-HQ, however work proceeds on the preparation of the UoSAT-B spacecraft for a nominal launch date of 1st March, 1984.

The structural design has been completed. The Spacecraft Interface Fitting and the launch vehicle Attach Fitting have been completed and the former has now been shipped to the launcher at MDAC. The spacecraft structure is well underway — all structural components have been completed including the module boxes. Further floating fasteners have to be procurred before assembly can take place.

A Spacecraft Design Review was held on Monday 26th September where the final experiment compliment and system design were examined, resulting in a number of changes in the light of the last few weeks work. Further minor changes will inevitably continue to be made as a result of design and prototyping experience. Negotiations have been completed concerning the procurement of solar arrays. Batteries remain unresolved as yet, although considerable effort is being expended by Larry Kayser on procurement. Latest reports from Canada look promising One source of small pin-pullers has been identified for tip-mass caging, although others are still being sought. The Navigation Sensors Electronics PCB artwork has been prototyped using in-house PCB CAD, the PCB produced and constructed. The sun sensor prototypes and being tested. Artwork for the CCD and radiation/particle detector memory boards is complete, and boards are under construction.

LAUNCHES

NUMBER	NAME	NATION	DATE OF LAUNCH	INITIAL DATA PERIOD MINS	APOGEE KM	PERIGEE KM	INCLN DEG	FACILITIES
1983-075A	COSMOS 1484	USSR	24th Jul	97 3	673	595	98	SI TM
1983-076A	COSMOS 1485	USSR	26th Jul	92 2	395	209	72.9	SI TM
1983-077A	TELSTAR 3A	USA	28th Jul	663 55	37459	185	23	FM TELEMETRY 2250 5 MHz
1983-078A	—	—	31st Jul					
1983-079A	COSMOS 1486	USSR	3rd Aug	100.8	820	786	74 1	SI TM
1983-080A	COSMOS 1487	USSR	5tn Aug	89 5	305	226	82 3	SI TM
1983-081A	CS2B	JAPAN	5th Aug	650	36807	169	28 9	CS Output 2286 5 MHz
1983-082A	COSMOS 1488	USSR	9th Aug	90.2	397	208	72 8	SI TM
1983-083A	COSMOS 1489	USSR	10tn Aug	88.3	323	182	64 7	SI TM
1983-084A	COSMOS 1490	USSR	10th Aug					SI
1983 084B	COSMOS 1491	USSR	10th Aug	676	19154		64 7	SI
1983-084C	COSMOS 1492	USSR	10th Aug					SI
1983-085A	PROGRESS 17	USSR	17th Aug	88 7	257	196	51.6	Auto Cargo Spacecraft
1983-086A	PRC 13	CHINA	19th Aug					
1983-087A	COSMOS 1493	USSR	23rd Aug	90 2	396	207	72.9	SI TM

Abbreviations SI — Scientific Instruments
TM — Telemetry
CS — Communications Satellite

The following satellites re-entered or decayed:

1973-076A	MOLNIYA 2	8th Ju
1983 064A	COSMOS 1471	28tn Jul
1983-071A	COSMOS 1482	27th Jul
1983-076A	COSMOS 1485	9th Aug
1983-080A	COSMOS 1487	19tn Aug
1983-082A	COSMOS 1488	23tn Aug

Together with 54 other space objects

OSCAR-10 APOGEES DECEMBER 1983

DATE	DAY #	ORBIT #	APOGEE UTC HHMM:SS	SATELLITE CO-ORDINATES LAT DEG	LONG DEG	BEAM HEADINGS SYDNEY AZ DEG	SYDNEY EL DEG	ADELAIDE AZ DEG	ADELAIDE EL DEG	PERTH AZ DEG	PERTH EL DEG
DECEMBER 1	335	351	0627 49	18	257	31	12	321	19	344	31
2	336	353	0546.54	18	247	318	18	330	24	356	33
3	337	355	0505 57	18	238	327	23	341	27	8	32
4	338	357	0424 59	18	229	337	27	351	29	19	30
5	339	359	0344 02	18	219	347	29	3	30	29	27
6	340	361	0303·05	18	210	359	30	14	28	38	22
7	341	363	0222 07	18	201	10	30	24	26	46	16
8	342	365	0141.12	18	191	21	27	33	21	53	10
9	343	367	0100 15	18	182	30	24	42	16	59	3
10	344	369	0019.18	19	172	39	19	49	11	•	•
10	344	371	2338.20	19	163	47	13	56	4	•	•
11	345	373	2257·23	19	154	54	7	62	-2	•	•
12	346	375	2216.25	19	144	60	0	•	•	•	•
13	•	•	•	•		•	•	•	•	•	•
14	348	378	0915·02	19	310	•	•	•	•	299	0
15	349	380	0834 04	19	301	•	•	•	•	305	7
16	350	382	0753 07	19	291	•	•	•	•	312	13
17	351	384	0712.09	19	282	•	•	303	2	319	19
18	352	386	0631 12	19	273	301	1	310	9	328	24
19	353	388	0550 15	19	263	307	7	317	14	338	28
20	354	390	0509.20	19	254	314	13	325	20	348	30
21	355	392	0428.22	19	244	322	18	334	24	360	31
22	356	394	0347.25	20	235	331	23	344	26	11	30
23	357	396	0306.28	20	226	341	26	355	28	22	28
24	358	398	0225.30	20	216	351	28	6	28	31	24
25	359	400	0144 33	20	207	2	29	17	26	40	19
26	360	402	0103.35	20	197	13	27	26	23	47	13
27	361	404	0022:41	20	188	23	25	35	19	54	7
27	361	406	2341 43	20	179	33	21	43	13	60	-0
28	362	408	2300 46	20	169	41	16	51	7	•	•
29	363	410	2219 48	20	160	48	10	57	1	•	•
30	364	412	2138.51	20	150	55	4	•	•	•	•
31	365	414	2057 53	20	141	61	3	•	•	•	•

OSCAR-10 APOGEES JANUARY 1983

DATE	DAY #	ORBIT #	APOGEE UTC HHMM:SS	SATELLITE CO-ORDINATES LAT DEG	LONG DEG	BEAM HEADINGS SYDNEY AZ DEG	SYDNEY EL DEG	ADELAIDE AZ DEG	ADELAIDE EL DEG	PERTH AZ DEG	PERTH EL DEG
JANUARY 1	•	•	•			•	•	•	•	•	•
2	2	417	0756 30	20	307	•	•	•	•	302	2
3	3	419	0715.33	21	298	•	•	•	•	308	8
4	4	421	0634 35	21	288	•	•	300	-3	315	14
5	5	423	0553.38	21	279	•	•	306	4	323	20
6	6	425	0512:40	21	269	304	2	313	10	332	24
7	7	427	0431 43	21	260	310	8	321	15	342	27
8	8	429	0350 48	21	251	318	14	329	20	352	29
9	9	431	0309 51	21	241	326	19	338	23	3	29
10	10	433	0228 53	21	232	335	23	348	25	14	28
11	11	435	0147 56	21	222	345	26	359	26	24	25
12	12	437	0106 58	21	213	355	27	9	26	33	21
13	13	439	0026 01	21	204	6	27	20	24	42	16
13	13	441	2345 04	21	194	16	25	29	20	49	10
14	14	443	2304:09	21	185	26	22	37	16	55	3
15	15	445	2223:11	21	175	35	18	45	10	•	•
16	16	447	2142:14	22	166	43	13	52	4	•	•
17	17	449	2101:16	22	157	50	7	58	-2	•	•
18	18	451	2020.19	22	147	56	1	•	•	•	•
19	•	•	•			•	•	•	•	•	•
20	•	•	•			•	•	•	•	•	•
21	21	456	0637:58	22	304	•	•	•	•	305	3
22	22	458	0557:01	22	294	•	•	•	•	311	9
23	23	460	0516 03	22	285	•	•	303	-1	319	15
24	24	462	0435.06	22	276	•	•	309	5	327	20
25	25	464	0354.08	22	266	307	3	316	10	336	24
26	26	466	0313 11	22	257	314	9	324	16	346	27
27	27	468	0232.16	22	247	321	15	333	20	356	28
28	28	470	0151 19	22	238	329	19	342	23	7	28
29	29	472	0110.21	22	229	339	23	352	25	17	26
30	30	474	0029.24	22	219	349	25	2	25	27	23
30	30	476	2348.27	22	210	359	26	13	24	36	18
31	31	478	2307·29	23	200	9	25	22	21	43	13

Mario Acuna (LU9HBG) has agreed to provide an improved Navigation Magnetometer. Most 1802 computer experiment interfaces have been prototyped in preparation for PCB layout. The PCB layout of the telecommand decoders and multiplexers is under way. Electronic component procurement is progressing well. Detailed specifications of the spacecraft system and interfaces are being prepared. These will be posted once the transients have died away!

SATELLITE PREDICTIONS

I have received considerable feedback on the subject of predictions and the main area of concern centres on Oscar-10. One positive suggestion was to provide the apogee for the day in the knowledge that for a time period plus and minus three hours of apogee that beam heading remains virtually constant. However, that plus and minus three hour window only holds for apogees in the centre of the overall (currently 14-15 days) cycle. At the start and finish of each cycle the TOTAL access to Oscar-10 may only be one to two hours maximum.

Acting on this suggestion I have computed the relevant information for Perth, Adelaide and Sydney for December 1983 and January 1984 and comments either for or against the predictions in this form would be appreciated as they will absorb considerable magazine space.

SATELLITE ORBIT ELEMENT TUTORIAL

An excellent article explaining the significance of elliptical elements has been compiled by Phil Karn KA9Q AMSAT Vice-President, Engineering. It details in the most simplistic manner the elements and considerations for elliptical orbits. In view of its length and the fact that the erstwhile editor demands copy for the January issue in the next week or so, I intend to include this tutorial along with other operating hints in the January issue and return to the normal column in February.

UPS AND DOWNS FOR JULY-AUGUST 1983

Once again thanks to Bob VK3ZBB we have the latest listing of launches and re-entries.

THAT TIME OF YEAR AGAIN

Yes, another year is about to pass, and I can only but conclude this year's contribution by extending to all readers of this column Season's Greetings and a Prosperous Year in 1984 for Satellite Communications.

de Colin VK5HI

AR

CONTESTS

Reg Dwyer, VK1BR
FEDERAL CONTEST MANAGER
PO Box 236, Jamison, ACT 2614.

DECEMBER

3-5	*ARRL 160 metre Contest*
3	*Ross Hull Memorial VHF Contest. START*
10-11	*ARRL 10 metre Phone Test*

JANUARY

7	*Ross Hull Contest. ENDS*
21-22	*White Rose SWL Contest*
28	*French CW Test*
27-29	*CQWW DX 160 metre Test*

FEBRUARY

4-5	*French 40 metre Phone*
11-12	*John Moyle National Field Day*
11-12	*Dutch PACC Test*
18-19	*ARRL CW DX Test*
25-26	*CQ WW 160 metre CW*
25-26	*RSGB 40 metre CW*

THE RD CONTEST AND NOVICE CONTEST

Because of the mail strikes affecting the delivery of logs to my post box, I have held the closing date of the contests open for a longer period to allow for the slow logs to arrive.

This means that the results will be delayed and are expected to be published in the February edition of AR providing this strike (current at the date of writing) concludes within the very near future.

VK-ZL QSO PARTY

The VK-ZL QSO Party held on 40 metres on 8th August between 2000 and 2200 hours was just as enjoyable as in the past in spite of much poorer conditions. Those who used both modes — CW and SSB — certainly had the advantages as copy was very much easier under the prevailing conditions on the CW end of the band.

RESULTS:

Station	Contacts	Multiplier	Score
ZL2AB	19	9	855
ZL2US	18	9	810
ZL3BJ	16	6	480
ZL1JQ	15	6	450
ZL1VX	12	7	420
ZL2HS	8	5	200
ZL3AY	8	3	120
VK3XB	28	10	1400
VK3KS	27	9	1215
VK3JA	24	10	1200
VK4AEM	24	9	1080
VK4AIX	23	8	920
VK4CJ	22	8	880
VK4OX	24	7	840
VK7CH	18	8	720
VK2ADR	18	8	720
VK4BG	18	7	630
VK3FC	16	7	560
VK3ZC	15	8	560
VK3LC	17	6	510
VK3NV	14	6	420
VK5KV	13	6	390
VK3XF	12	5	300
VK2HQ	11	4	220
VK7JU	11	4	220
VK4ALW	7	6	210
VK3YW	5	4	100
VK6EF	6	3	90

THE "AIRNET INDIA" INTERNATIONAL DX CONTEST — WCY 1983 — CW SECTION

The purpose of the "AIRNET INDIA" International DX Contest 1983 is to enhance the activity of the amateur radio movement in India and offer an opportunity to all world amateurs to establish on a competitive basis contacts between one another and Indian amateurs.

The contest will further be an effort to commemorate the WCY 1983 and will be run by the organisers of the "AIRNET INDIA" a voluntary net organisation of Indian and DX amateurs. The team for conducting the contest will comprise of the following: VU2AID, VU2BBJ, VU2AIG, VU2RX, VU2NA, VU2TN, VU2TS, VU2YZ.

PERIOD OF CONTEST OPERATION — Contest starts on 3rd December, 1983 at 0000 UTC and ends on 4th December, 1983 at 2400 UTC.

MODES OF OPERATION — Contest participants will confirm operations on the various amateur bands in accordance with the accepted conventions and practices. Only contacts with amateur stations authorised by the administration will be acceptable. CW operators are expected to use conventional apparatus, in the interest of the hobby.

ELIGIBILITY — All licenced CW amateurs of the world are eligible.

FREQUENCIES OF OPERATION — All frequencies in the HF band, inclusive of the new WARC bands can be used.

POWER LIMITS — Power will be limited to those authorised in each country.

ENTRY CLASSIFICATIONS — Category A — Single operator, multi-band. Category B — Single operator, single band. Category C — Multi-operator, multi-band . . . open to clubs only. Category D — Multi-operator, single band . . . open to clubs only. Category E — Family groups . . . OM/YL/XYL teams only.

OPERATIONAL RESTRAINTS — Cross band operation, Split Mode operation, Split frequency operation are not permitted. Multi-operator stations may not work simultaneously on the same band, but are permitted to work on different bands at the same time. Countries not permitted under the IARU are ineligible. Working on DXpedition frequencies would be discouraged.

SCORING DETAILS — All contacts on 14, 21 and 28 MHz bands with an Indian station counts two points and on the new WARC bands and 3.5 and 7 MHz bands count as four points. Working stations from pincode zones 2, 7 and 8 will double the points above. This is because there are very few active stations in these areas.

MULTIPLIERS — Number of zones worked in VU.

FINAL COUNTS — Number of contact points multiplied by the multipliers for each band.

OPERATION DETAILS — Give R S (T), and age of operator. Club stations will give instead of age the figures (02)

SUBMISSION OF LOG SHEETS AND SUMMARIES — All contest log sheets, summaries will be forwarded to any of the following addresses before 20th December.

Capt D Dasan, "Airnet India", 'CLARA', 5-B, Versova

Cross Roads, off Four Bungalows, Andheri West, Bombay — 400 058, India.

or

Mr K Asutoshan, C/O TVS Limited, TVS Amateur Radio Club, PO Box No 21, Madurai 625 016, India. Handsome certificates will be awarded to the winners.

Note: A phone contest was held on 19th November by this same organisation with the same rules but unfortunately they arrived too late for printing.

3RD ANNUAL — 40-METRE WORLD SSB CHAMPIONSHIP CONTEST

SPONSORED BY — 73 Magazine, Peterborough, New Hampshire, 03458.

CONTEST PERIOD — 0000 to 2400 UTC, 7th January, 1984

RULES — Work as many stations as possible on 40 Metre Phone during the specified times of allowable operation. The same station may be worked ONCE. Crossmode contacts will not count. Single operator stations may operate a total of 16 hours. All the multi-operator stations may operate the entire 24-nour period. Off periods must be noted in your log(s) and on your summary sheet. Off periods are NO LESS THAN THIRTY MINUTES EACH.

OPERATOR CLASSES — (A) Single Operator, Single Transmitter, Phone only (B) Multi-Operator, Single Transmitter, Phone only

EXCHANGE — Stations within the Continental forty eight US States and Canada transmit a RS report and State, Province or Territory. All other stations, including Alaska and Hawaii, transmit RS report and DX Country.

POINTS — Five QSO points for contacts with W/VE stations located within the Continental forty eight US States and Canada. All other contacts score ten points each. List points for each contact on your logsheet.

MULTIPLIERS — *One Multiplier Point* is earned for each US State (forty eight maximum — A District of Columbia contact may be substituted for Maryland multiplier), each Canadian Province or Territory (thirteen maximum), and DX Country (excluding the Continental US and Canada).

FINAL SCORES — Total QSO points times Total Multiplier points equals Claimed Score.

CONTEST ENTRIES — Each entry must include a contest log, a dupesheet, a contest summary and multiplier check list.

CONTEST DEADLINE — Each entry MUST be POST-MARKED no later than 12th February, 1984

DISQUALIFICATIONS — Omission of any required entry form, operating in excess of legal power, manipulating of contest scores or times to achieve a score advantage or failure to omit duplicate contacts which would reduce the overall score more than two per cent are all grounds for immediate disqualification. Decisions of the contest committee are final

AWARDS — Contest awards will be issued in each operator class in each DX Country represented a minimum of 100 QSOs must be worked to be eligible for contest awards.

CONTEST ADDRESS — 40 Metre Contest, Dennis Younker, NE6I, 43261 Sixth Street East, Lancaster, CA 93535

3RD ANNUAL — 75-METRE WORLD SSB CHAMPIONSHIP CONTEST

SPONSORED BY — 73 Magazine, Peterborough, New Hamshire, 03458.

CONTEST PERIOD — 0000 to 2400 UTC, 8th January, 1984

MISC RULES — Work as many stations as possible on 75 Metre Phone during the specified times of allowable operation. All other rules as per 40 Metre Contest.

CONTEST ADDRESS — 75 Metre Contest, Jose A Castillo, N4BAA, 1832 Highland Drive, Amelia Island, FL 32034.

5TH ANNUAL — 160-METRE WORLD SSB CHAMPIONSHIP CONTEST

SPONSORED BY — 73 Magazine, Peterborough, New Hamshire, 03458.

CONTEST PERIOD — 0000 14th January, 1984 to 2400 UTC 15th January, 1984.

OBJECT — To work as many stations as possible on 160 Metre Phone in a maximum of 32 hours allowable contest time. Multi-operator stations may operate the entire 48-hour contest period. Stations may be worked only once.

ENTRY CATEGORIES — (1) Single Operator, Single Transmitter, Phone only. (2) Multi-Operator, Single Transmitter, Phone only.

EXCHANGE — Stations within the Continental US and Canada transmit RS report and State or Province/Territory. All others transmit RS report and DX Country.

POINTS — Five QSO points for contact with W/VE stations contacted within the Continental forty eight US States and Canada. All other contacts earn ten points each.

MULTIPLIERS — One Multiplier Point will be earned for each of the Continental US States (forty eight maximum — A District of Columbia contact may be substituted for a State of Maryland multiplier), each of the Canadian Provinces/Territories (thirteen maximum), and each DX Country outside the Continental forth eight US States and Canada.

FINAL SCORES — Total QSO points times Total Multiplier points equals Claimed Score.

CONTEST ENTRIES — Each entry must include logsheet, dupesheet for 100 or more contacts, a contest summary and a multiplier check sheet.

CONTEST DEADLINE — Each entry must be postmarked no later than 19th February, 1984.

DX WINDOW — Stations are expected to observe the DX Window from 1 825-1.830 MHz as mutually agreed by Top Band operators. Stations in the US and Canada are asked not to transmit in this 5 kHz segment of the band. During the contest all W/VE stations are requested to utilise only those frequencies from 1.808-1.825 and 1.830-1.900 MHz.

DISQUALIFICATIONS — Disqualification may result if contestants omits any required entry form, operates in excess of legal power authorised for his/her given area, manipulates operating times to achieve a score advantage or fails to omit duplicate contacts which reduce the overall score more than two per cent. Decisions of the contest committee are final.

AWARDS — Contest awards will be issued in each entry category in each DX Country. A minimum of 100 QSOs must be worked to qualify.

CONTEST ADDRESS — 160 Metre Contest, Harry Arsenault, K1PLR, 603 Powell Avenue, Erie, PA 16505.

3RD ANNUAL — RTTY WORLD CHAMPIONSHIP CONTEST

SPONSORED BY — The RTTY Journal and 73 Magazine.

CONTEST PERIOD — 0000 to 2400 UTC, 25th February, 1984.

MISC RULES — The same station may be worked ONCE ON EACH BAND. Crossmode contacts do not count. Single operator stations may work 16 hours maximum, while the multi-operator stations may operate the entire 24-hour period. Off times are NO LESS than thirty minutes each and MUST be noted in your log(s).

OPERATOR CLASSES — (A) Single Operator, Single Transmitter. (B) Multi-Operator, Single Transmitter.

ENTRY CATEGORIES — (A) Single Band, (B) All Band, 10-80 Metres

EXCHANGE — Stations within the forty eight Continental US States and Canada must transmit RST, and State, Province/Territory. All others must transmit RST and consecutive contact number.

QSO POINTS — Five QSO points for contacts with W/VE stations located within the Continental US and Canada. Ten QSO points for all other contacts.

MULTIPLIER POINTS — One Multiplier Point is awarded for each of the forty eight Continental US States, (A District of Columbia contact may be substituted for a State of Maryland multiplier), Canadian Provinces/Territories DX Countries worked on each band (excluding US and Canada)

FINAL SCORES — Total QSO Points times Total Multiplier points equals Claimed Score.

CONTEST ENTRIES — Entries must include a SEPARATE log for EACH BAND, a dupesheet, a summary sheet, a multiplier check list, and a list of equipment used.

ENTRY DEADLINE — All entries MUST be POSTMARKED no later than 15th April, 1984.

DISQUALIFICATIONS — Omission of the required entry forms, operating in excess of legal power, manipulating scores or times to achieve a score advantage or failure to omit duplicate contacts which would reduce the overall score more than two per cent are all grounds for immediate disqualification. Decisions of the contest committee are final.

AWARDS — Contest awards will be issued in each entry category and operator class in each DX Country represented. Other awards may be issued at the discretion of the awards committee. A minimum of 25 QSOs must be worked to be eligible for awards.

CONTEST ADDRESS — RTTY World Championship Contest, C/O The RTTY Journal, PO Box RY, Cardiff, CA 92007.

SINGLE OPERATOR:

1 I5FZI	2,410,500	37 VK2SG	57,900
2 VK2RT	2,405,976	38 DF6WCY	36,500
3 I8JVK	2,012,586	39 KB2VO	34,248
4 JA6GIJ	1,612,256	40 VK2BIS	31,592
5 VK2TTY	1,508,220	41 K6WZ	27,837
6 OZ1CRL	1,290,040	42 DF5BX	26,888
7 I4JXE	1,119,668	43 DK4EC	25,850
8 JR2CFD	983,132	44 DJ8WCY/P	25,836
9 K4AGC	978,644	45 DL9MBZ	24,036
10 JH2PDS	938,894	46 SP2UU/1	20,340
11 DL1VR	807,896	47 OZ1GRF	20,092
12 I8JRA	620,582	48 OK1SPS	17,199
13 VK8HA	613,314	49 JA2VHG	15,798
14 YB2BLI	551,448	50 DK9CK	12,240
15 VK2BQS	483,888	51 TI2DO	12,032
16 W5HEZ	475,690	52 F3IJ	8,875
17 OK3KJF	400,688	53 JF3PLF	8,444
18 G3HJC	368,580	54 OE5PTM	8,120
19 JR6AG	300,315	55 JI3AXU	6,368
20 JA2VFW	285,376	56 JA7ML	4,936
21 JA5TX	258,625	57 PY3IT	3,960
22 VE2QO	237,650	58 PA3BVT	3,664
23 JA1IQV	183,164	59 DK8DB	3,332
24 SM5FUG	181,856	60 SM6JQK	3,120
25 SM7AIA	156,730	61 DK5KJ	2,884
26 JA1BYL	152,765	62 YO3RF	2,838
27 SM7SLU	138,890	63 VK2APQ	2,160
28 W2KHQ	136,410	64 JJ1EEA	1,584
29 OE2SNL	131,448	65 HK5BZ	1,519
30 DJ4OP	107,120	66 SM6OEQ	1,188
31 VE7VP	90,936	67 JN1BAX	964
32 VK3BUS	87,480	68 JH3DPB	918
33 WB4UBD	79,060	69 DF7FB	648
34 JF2PZH	65,600	70 VK2BLU	504
35 IK5CKL	62,115	71 SP2FF/1	496
36 VK2EG	62,064	72 VK2AJT	435

MULTI-OPERATOR SECTION:

1 VE3UR	316,030	2 JA2YKA	90,615
3 OK3KII	41,310	4 VK2BQK	10

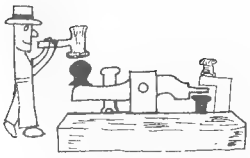
SWL SECTION:

1 OZ-DR-2135	1,096,590	2 E L Ludwig	372,310
3 J R Matthews	349,016	4 NL-4483	248,256
5 K Wustner	50,960	6 JA3-30356	40,968
7 JA1-25711	31,280	8 DL-H53-1881044	8,034
9 H Ballenberger	3,985	10 JA1-7777	294

Christmas Greetings to all

73 Reg VK1BR

AR



POUNDING BRASS

Marshall Emm, VK5FN
GPO Box 389, Adelaide, SA 5001

This month's column is based on a letter received recently from Al Rechner, VK5EK, who has very kindly given permission to use it. The letter is self-explanatory, so without further preamble . . .

Dear Marshall,

A member of the WIA for over thirty years, a licensed amateur for over twenty five, I have been a keen student of high frequency technique all my life. I have been reading your "Pounding Brass" column in Amateur Radio since its inception some twelve months ago. The column is well written, well researched and very informative. Often as not, it is the first thing I read. You are to be congratulated on it.

I claim to be very well informed on technical matters, and I have been unable to fault you technically, except perhaps for one minor point in the first column (August 1982, p 40). That point is the subject of this letter.

You imply that keyed continuous wave transmissions of the ordinary type; that is, the normal CW we hear on the bottom end of the amateur bands, should be more properly described as ICW or Interrupted Continuous Waves. This is incorrect. Interrupted Continuous Waves are fundamentally different from Keyed Continuous Waves. ICW transmissions are those in which the carrier wave is turned on and off at an audio rate, often by mechanical means. In early days, a simple buzzer was connected in series with the plate supply to the transmitter, so that when the key was pressed the buzzer "interrupted" the power supply at an audio rate. That is, the buzzer turned the power on and off at, say, 500 Hz. The result was a Morse signal on air that sounded very like a buzzer. It needed no BFO on the receiver, it had a piercing, raucous note that carried very well through heavy QRM, and was very pleasant to copy, and very easy to copy in the presence of QRM/QRN.

As can probably be imagined, the transmitted signal tended to be very broad and splattery and the system fell into disuse mainly for that reason. Although I can see no technical reason why the signal should be any wider than, say, an SSB signal. The system tended to be rich in audio harmonics, indeed it was this high harmonic content that gave the system its characteristic piercing sound. This would mean that sidebands would extend out for a couple of kHz either side of the carrier, giving a total bandwidth of, say, 3 or 5 kHz, which would be unacceptably wide today, particularly in the CW bands.

A variation of ICW is still in use today and can often be heard with marine traffic on the 500 kHz distress frequency. This variation involves modulating the carrier with a single, sine wave audio tone of about 500/800 Hz. When keyed, these transmissions can be read without a BFO, and when read with a BFO have an unusual "two-tone" sound which is quite easy to copy.

Thank you, and congratulations once again on an excellent column.

Best regards, Al Rechner, VK5EK.

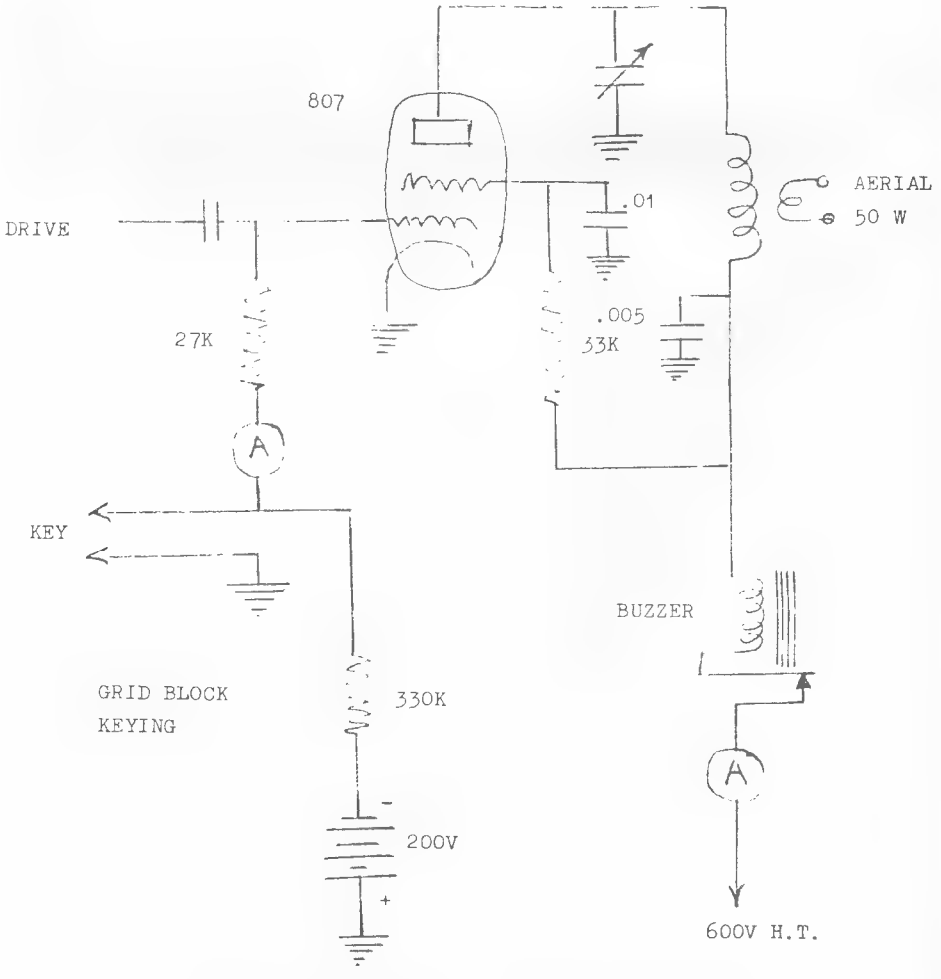
In thanking Al for his letter, I would like first of all to apologise for the original error. It resulted from my own interpretation of what appeared to be "common knowledge", but Al is 100% correct on both the history of ICW (used more or less interchangeably with MCW for Modulated CW) and the value of the ICW sound in getting through QRM/QRN. In fact, a recent article in an American magazine concerning an audio filtering device suggested that audio harmonics would be a useful addition at the receiver.

But if I could get back to the point of what I was saying in that original article, just for the record, we are still being pretty un-technical when we refer to CW as an operating mode —many amateurs seem to say CW when they mean Morse code. As an example of this, how often have you heard a reference to how fast someone can "copy CW"? A purist would perhaps have us call the mode KCW for Keyed Continuous Wave, or perhaps even Keyed Un-Modulated Un-Interrupted Continuous Wave! Then again, A1A is perfectly adequate, and I am far less concerned with what we call it than how we use it.

Attached to Al's letter was a schematic for the PA of an ICW transmitter which is reproduced for its historical interest. But please don't try to build it, or if you build it, don't use it. Apart from its wastefulness in terms of bandwidth, ICW is not a permitted mode for amateurs in this country.

Next month we'll be talking about QRPp operation, and I'll include a circuit which you can build from readily available parts and use to your heart's content. Till then, keep pounding brass, and keep the letters coming! 73.

AR



Power Amplifier Section of a 50 W ICW Transmitter.

WICEN NEWS

Ron Henderson, VK1RH
FEDERAL WICEN CO-ORDINATOR
171 Kingsford Smith Drive, Melba, ACT 2615

REPORT ON COUNTER DISASTER COMMUNICATIONS STUDY JULY 1983

INTRODUCTION

The Department of Communications and the Natural Disaster Organisation, Department of Defence jointly sponsored a Counter Disaster Communications Study, held at the Australian Counter Disaster College, Macedon, Victoria from 24th to 27th July, 1983.

The Study was attended by representatives from DOC, NDO, OTC, Telecom, Australia Post, State disaster control agencies, the ABC, AUSSAT, the Royal Flying Doctor Service and the WIA. The departments of Transport, Aviation, Industry and Commerce, Defence, Prime Ministers and Cabinet and Science and Technology were also represented

As Federal WICEN Co-ordinator I attended as the WIA representative.

STUDY PROGRAMME

The Study opened with a little over a day devoted to briefings by agencies prominent in disaster communications before commencing a series of four seminar topics loosely related to the Study scenario. This was a simultaneous occurrence of a severe earthquake in Adelaide, a tropical cyclone and storm surge in Cairns and major statewide bushfires in Victoria.

COMMUNICATIONS REQUIREMENTS

The first seminar topic was the production of a list in priority order of counter disaster communications requirements, what could be termed a "wish list". This was then developed across the pre-disaster, disaster and post-disaster phases by levels of activity viz, Commonwealth, state, local authority and industry.

EXISTING CAPABILITIES

The second topic was the preparation of a summary of Australia's current capabilities, expanded to indicate considered deficiencies in capabilities and proposed solutions. The Study identified fifteen areas of deficiency as follows:

- *Potential overload of the public switched telephone network (STN) and cable systems prone to damage.*
- *Emergency communications not interfaced with the STN.*
- *Inability to answer public enquiries.*
- *Broadcasting systems vulnerable.*
- *Inability of counter disaster (CD) groups to intercommunicate by radio (frequency planning deficiencies).*
- *Remote and underserviced areas exist.*
- *Insufficient mobile services exist.*
- *Lack of CD charter for Telecom (including subscriber priorities) and OTC (subscriber priorities and limited capacity).*
- *Limited capacity for Defence communications network involvement in CD.*
- *Insufficient defence strategic and tactical capability.*
- *Lack of physical diversity*
- *CB radio lack of range and inexpert operators.*
- *Lack of interactive capability for national (ABC and commercial) radio and TV.*
- *Lack of availability of aircraft as a communications tool.*
- *If cost were no object:*
  - *more HF capacity for interstate operations and direct contact to NDO.*
  - *another Transportable Emergency Broadcasting Station (TEBS).*
  - *improvement of data links.*
  - *improved access to satellites.*
  - *provision of video links.*
  - *more media interface.*
  - *provide discrete auto telex system.*
  - *provide more staff and training.*

SHORT TERM IMPROVEMENTS

The deficiencies of topic two led into topic three, "short term improvements" (achievable in a five year period). Generally these were low cost and/or management type fixes and were enumerated in the following areas:

- *Telecom.*
- *Frequency allocations, useage and management.*
- *Licencing arrangements.*
- *Operator training.*
- *Intra-State, Territory liaison and co-ordination.*
- *Inter-State/Territory/Commonwealth liaison and co-ordination*
- *Support from the Australian Defence Force including Defence Communications Network.*
- *Overseas Telecommunications.*
- *Broadcasting and other Media Liaison.*

LONG TERM IMPROVEMENTS

The last topic addressed long term (to year 2000) improvements in CD communications and concentrated on seven aspects.

For Satellites. *Greater flexibility through mobile ground stations; overcome the convergence factor on other communications agencies; mode compatability with mobile radios and in the long term broadcast capability to individual households.*

In the Immediate Disaster Area. *All communications modes, viz, UHF, VHF, telephone, telex, video, FAX. With portable mobile data systems using intelligent terminals to hold, review and transmit information. Electronic recording for log keeping purposes.*

Federal/State/Territory Communications. *Data, telephone, telex and FAX on a dedicated system with a planned backup system.*

Role of Data Communications. *An aspect of major advancement. Introduce system to control of operations, information gathering and distribution.*

Operator Training. *Through use of friendly equipment and provision of adequate funds for training experience.*

Equipment Commonalty. *By means of user friendly equipment, systems translators and clear specifications followed by effective quality assurance and acceptance procedures*

Dedicated Backup. *Achieved through reserves and acknowledgement of obligation (ie: dedication to task) by all agencies. Needs full planning to identify alternatives and define levels of priorities of fall-back options*

SUMMARY

Throughout the study amateur radio took a low key role which was quite expected in the light of the full range of available communications depicted However informal discussions with participants indicated a consistant respect for the amateur operator and his involvement, unfortunately coupled with uncertainty as to his role As all State Emergency Services were represented it is now opportune for State WICEN co-ordinators to follow up with their SES communications officers their role and involvement in the appropriate State counter disaster communi cations plans.

A full report of the Study will be printed and issued to participants and their parent organisations, hence both FE and I will have copies as will the various SES officers so interested amateurs should have access to copies

AR

QSP

POLICE CARS OF THE 1990s

Will have their own exterior closed circuit TV camera with video recording facilities, an internal TV monitor and a direct link with its force's headquarters central computer.

A specially converted working model of this type of police car was viewed by senior police officers from Germany, Denmark, USA, Britain and two officials from China at a recent International Police Video Symposium in south east England.

This car, a traffic control duties Ford, was converted at a cost of $30,000.

from Information Technology from Britain, 23 September 1983

AR

HERE'S RTTY!

Bruce Hannaford, VK5XI
57 Haydown Road, Elizabeth Grove, SA 5112

FREQUENCY SHIFT KEYING

As pointed out in the very first RTTY article I wrote in this series a HF bands FSK RTTY transmitter can be a very simple device indeed. There are many advantages in using "DC switched" FSK instead of the more common "Audio generated" FSK as obtained by feeding audio tones into a SSB type transmitter. For "DC switched" FSK there is no need to use any filters, mixers or audio stages etc. The transmitter could be as simple as a crystal oscillator fed into an antenna. In fact I have tried feeding the crystal oscillator stage of one of my transmitters straight into the antenna and did get good results for the low power used. Just think of the delightful simplicity of such a transmitter. I used a valve crystal oscillator, only one RF tuned circuit in the whole transmitter and only a dozen or so components involved. This sort of thing could revive home brewing once again.

I note when you talk about such a set up, most reply *"But it is crystal controlled and you need to use a VFO these days"*. Well a VFO controlled transmission is certainly useful and perhaps almost essential for SSB work but not necessarily so for RTTY. Most RTTY is confined to very small portions of our bands so a few well chosen crystals will often suffice for plenty of enjoyable contacts. Because exceptionally high stability is required for RTTY, home brewing of VFOs is often not successful and the easy way out is to use crystal control. Of course the crystal oscillator should preferably be followed by an amplifier stage or stages to get more power output and better isolation between the antenna and the crystal circuit. Also the crystal oscillator stage will normally need to be fed from a regulated power supply especially if the RF output is to be higher in frequency than the 7 MHz band.

Crystal oscillator circuits are common place but the RTTY keying methods applied to them are not so well known so I will give at circuit I often use and find very satisfactory. As amateur convention has it that the RF frequency for Mark must be the higher frequency of the RF pair and that the Space frequency must be the lowest one, switching a small capacitor across the crystal for space will establish "normal" (right side up) RTTY. With the circuit shown the closed circuit (Mark) condition switches OUT the capacity allowing the oscillations to be at the highest frequency this giving "normal" RTTY operation. This circuit uses diode switching however for 45.45 Baud RTTY mechanical relays are often quite satisfactory and could be used if desired. We are presupposing that the RTTY keyboard device used to key the transmitter has a switching output and is not limited to audio tones output. All communications computers I have seen do have such an output and mechanical systems can easily be arranged to give switching output.

Looking at the circuit the main points of interest are the switching action of the diode and the effects of capacitors C1 and C2. The diode switching is accomplished by the RTTY keyboard opening and closing the RTTY input connection. When the input circuit is closed the lower end of the diode (it's Anode) is DC earthed through the RF choke and the low value R4 resistor, about +75 volts from R1 and R2 is applied to the top or cathode end. This voltage reverse biases the diode making it non conducting. When the input circuit is open the lower end of the diode is fed from R3, which is connected to +150 volts, the diode now conducts as +150 volts is 75 volts more positive than the +75 volts at the junction of R1 and R2 which is connected to the cathode end of the diode.

When the diode is non conducting C1 is in effect disconnected and has little or no effect on the crystal frequency but when the diode conducts C1 is connected and will pull the crystal to a slightly lower frequency. The RF voltages present on each side of the diode are confined to the RF switching circuit path by the RF choke and by R1, R2. C3 is a DC blocking capacitor and the ferrite bead is used to prevent VHF parasitics being generated. With C2 set to zero capacity the amount of frequency shift will be determined by the setting of C1. The maximum possible value of C1 should be great enough to give sufficient shift on the lowest frequency band use and this with the most reluctant crystal. It will then be found that on bands such as 28 MHz, even at the minimum setting of C1, more shift than desired will often occur. If C2 is set at a fairly high capacity the switching of C1 will have very litle effect and a small shift can then be obtained. Of course the total combined capacity of C1 and C2 must not be too great or the crystal will not oscillate, but with sensible settings 170 Hz shift can be obtained on all bands. Summing it up. On lower frequency bands C2 is set to zero and C1 is set to a rather large capacity to get enough shift. On high frequency bands C2 is set to a rather large capacity and C1 to zero capacity.

Some crystals are more active than others and these will oscillate with large amounts of capacity across them, also some crystals require more capacity than others to shift a given number of Hz. It largely depends on the quality of the crystal used and the type of cut made. Two crystals of identical frequency may give different shifts with the same value of C1 in use. However if you were to order a batch of several crystals of similar frequency most likely all of them would shift in much the same way. I find it is usually easy to get 170 Hz shift on all HF bands but sometimes difficult on 160 metres depending on the cut of the crystal.

I prefer to use the old style large crystals in holders that can be unscrewed rather than modern miniture types using plated crystals in sealed holders. My preferance is because the larger crystals can handle more RF Power and their frequency can be changed by grinding them on a piece of glass coated with an abrasive paste. If you want tips about crystal grinding ask old timers, as crystal grinding was common place a few decades ago and most old timers have had a go at it. Often old style crystals can be bought at disposals shops for about $1 each. Usually amateur band frequencies will have been picked up by "early birds" but often crystals a little lower than an amateur band can be obtained and then ground to the desired frequency in the band.

Of course the same type of keying circuits can be used across a VFO tuned circuit or part thereof and it will be quite easy to get enough shift. The same basic circuit can also be used with solid state crystal oscillators except different resistor values to suit the lower DC supply voltages will be needed. I have found that most VFOs can be RTTY keyed by a slight

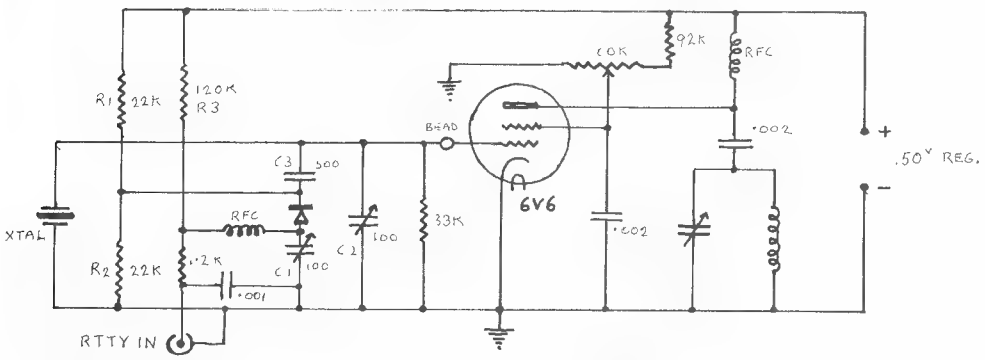


Figure 1 — FSK Crystal Oscillator.

change of supply volts. In one solid state VFO I tried .1 of a volt change in the 9 volts regulated supply gave 170 Hz shift. Of course the voltage changes need to take place very rapidly and if the RF filtering capacitors in the voltage supply line are large their value may need to be reduced. If you wish to build a VFO controlled FSK transmitter an easy way to do this is to buy an External VFO unit intended for a SSB type transceiver. This unit is then heterodyned with a few crystals to cover the desired bands. An easy way to check your shift is to print your own outgoing signals and adjust the shift to give proper mark and space indications. Well I trust the foregoing has encouraged at least a few to build their own RTTY transmitters as it is really quite simple especially with crystal control.

Last month I gave some details of Code Readers and Converters. Well I have spent quite a bit of time using a MBA-RO Code Reader on air and am favourably impressed by it. For those who obtain one of these units I would like to stress the importance of carefully studying the handbook instructions before attempting to use the unit as some very exact tuning is needed. The instruction book is easy to read and I note only one error on page 5 where, for 14 MHz amateur band RTTY, you are told to be sure to set the receiver switch to USB of course this should be LSB for amateur RTTY and in most cases it would be USB for commercial RTTY. I would have liked to see a normal reverse switch on the unit to save retuning using the other sideband, but for amateur use this is hardly necessary as 99% of the time LSB will give correct copy.

Operating the unit I found it easier to read the one line moving display if it were some distance away and not just under my nose. The threshold control is rather critical but a bit of practice tuning in strong signals soon teaches you how to use the control. The unit operated well on CW, RTTY and ASCII. It should be a boon to SWLs, intruder watchers, for portable work and for monitoring ones outgoing transmissions. Mechanical RTTY operators would find the unit useful for receiving marginal signals which waste much paper before you get them tuned in, you could save your paper until you decided if the station is worth printing. The filters are tuned to 800 Hz for CW or RTTY Mark with space frequencies of 970 (170 shift) and 1225 (425 shift). The 800 Hz is an advantage for the typical transceiver CW filter but is a disadvantage for AFSK on VHF bands, however the catalogue states that the filter frequencies can be easily changed so this could be overcome.

Summing it all up the MBA-RO will not equal the convenience of a RTTY unit with a VDU page display, but on performance value per dollar spent very good value indeed.

73 from Bruce VK5XI

AM

INTRUDER WATCH

Bill Martin, VK2EBM
FEDERAL INTRUDER WATCH
CO-ORDINATOR
33 Somerville Road, Hornsby Heights, NSW 2077

You may remember in the Intruder Watch column last month, a random check of the 40-metre band, in the amateur segment, 7.0-7.1 MHz, revealed a staggering 70.7% of the segment taken up with intruder transmissions. Taking this a step further, and with many thanks to Col, VK4AKX, for his many hours monitoring intruders, we find that taking some observations over the period 1400 to 2130 UTC, (midnight to 7.30 AM EST) and taking an average of intruder activity, the results show that 49.98% of the amateur segment of 40 metres was occupied by broadcast intruders, and only 50.02% left for amateur use.

In other words, our primary segment of the 40-metre band is effectively reduced by half. Most of these intruders are based in China or Albania — very considerate of them — it would be a great state of affairs if all the radio frequency spectrum users wandered all over the bands at will, as these people do. Hopefully, in January, 1984, at Geneva, the WARC for broadcasters may see some changes. We certainly hope so.

Now for a little information of which, I think, most amateur operators will not be aware, and this one really bears thinking about, hopefully, also, it will drive home the point that every country involved in amateur radio MUST HAVE a working Intruder Watch.

"THE SIXTY-DAY RULE"

The "60-day Rule" is part of the International Telecommunications Union (ITU) radio regulations. Under the old numbering of the regulations, the rule was No 515 and 526.

This rule allows ANY administration to assign ANY of its stations to ANY frequency, and so long as no reports of harmful interference are received by the station or the International Frequency Registration Board (IFRB), of the ITU within the 60-day period, the administration can insist on registration of its useage of the frequency. If you think about it, you can see that ALL amateur frequencies are in jeopardy from this rule. It has been used in the past, and no doubt will be used in the future. So you can see that any new intruders heard must be reported quickly, or else we may find that we're stuck with them. Very shortly in the new year, I will make available some statistics on the number and type of reports processed by the Intruder Watch for the period 1st January, 1983 to 31st December, 1983.

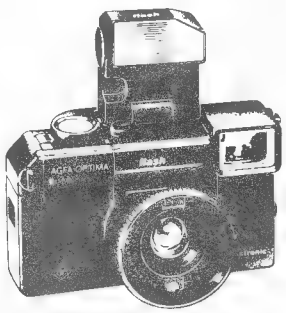
Should make some interesting reading, and will be rather alarming for those who are not familiar with intruder activity. Very best wishes for Christmas and the new year to all, and many thanks especially to those who have given strong support to the Intruder Watch in 1983.

AM

THE RADIO REPAIR SHOP

For quick and reliable servicing of
HF, VHF & UHF TRANSCEIVERS

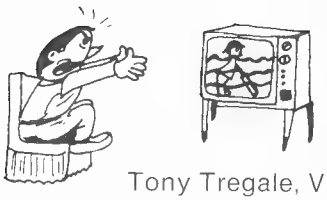
Contact
ANDY VK3DPJ
Telephone: (03) 553 3483



NOVEMBER'S BEST PHOTOGRAPHS

The judges at AGFA-GAVAERT, Quadricolor and Waverley Offset Printing Group all select the front cover photograph of the November issue.
This photograph will now be considered for the Optima camera prize at the end of the competition in June 1984.

NATIONAL EMC ADVISORY SERVICE



Tony Tregale, VK3QQ
FEDERAL EMC CO-ORDINATOR

"THE LIGHT AT THE END OF THE YEAR"

"The Bill is dead — long live the Act." By the time you are sitting down to your Christmas turkey we should have a new Radiocommunications Act

The EMC aspects of the Act will, we trust go a long way towards allowing us to see some light at the end of the most difficult political and practical EMC tunnel. The power contained in the Act will, pending the drafting of the regulations and standards, allow the Department of Communications to do the job for which they were appointed The Department will, for the first time, be in a position to administer one of our most important natural resources, the radio frequency spectrum, with effective legal powers rather than the wishy-washy situation which has existed for so many years under the old Act

The new Act will advantage the Amateur Service in most areas because the Amateur Service is a very responsible and a very technically qualified user of the radio frequency spectrum The Amateur Service is very conscious of the need for effective EMC

Indeed, the Amateur Service has been promoting the social, "political" and technical benefits of effective EMC for many years, and is well qualified in both the theoretical and practical aspects of EMC technology

Nevertheless, members of the Amateur Radio Service should not forget that the Department of Communications does have the power to close down an Amateur Station The Department of Communications is the government appointed control body for the supervision of the electromagnetic spectrum In this role they are permitted to close down any communications or broadcast service, and this includes the Amateur Service

Members of the Amateur Radio Service are most likely to be requested or directed to restrict hours of operation or close down their station in relation to a complaint of interference. However, in these enlightened days of modern communications technology, officers of the Department are well aware of who is to blame for various interference problems — *they do not go out of their way to persecute members of the Amateur Service*

Amateurs should realise that the Department's Radio Inspectors, quite often, work under extreme psychological pressure when dealing with the very complex and diverse nature of interference The situation is compounded by the many and varied problems encountered when dealing with human behaviour, coupled with the social, political and economic issues of our diverse society

Officers of the Department of Communications may, when investigating a case of interference, find it advantageous to the smooth progress of the investigation, to request the amateur station to cease operations for a specified period of time, even though the amateur station equipment is not at fault Under these conditions, members of the Amateur Service should, in the interest of good public relations, co-operate with the Department's officers in this respect.

However, members of the Amateur Service are entitled to be given reasons for any restrictions imposed by officers of the Department of Communications

Members of the Amateur Radio Service are advised to contact the National EMC Advisory Service if they consider any action by the Department of Communications, in respect of EMC, is harsh or unjustified

This may be a good time of the year to give the shack a "bit of a check-over" — perhaps review that "birds nest" of cables behind the equipment racks, shorten the excessively long cables, check the equipment earth bonding and check antennas for loose corroded connections . . . A complaint of interference can arrive at any time — the new neighbour with his unfiltered equipment, the Christmas present with "rabbit ears", or the robot with the disc memory

As most of us know only too well, the majority of interference complaints are not caused by problems in the transmitting equipment but by deficiencies in the receiving equipment. However, it is most important to keep a close eye on those unwanted harmonics, which not only help to cause interference but also become a drain on your hard earned power. Transmitter alignment should be carried out with the aid of a spectrum analyser in order to ensure that all harmonic levels are as low as possible (or within manufacturers specifications) before the signal is fed to the low pass filter arrangement.

Use of a low pass filter alone does not make any provision for dissipation of the unwanted harmonic energy produced by the transmitter. Since there is a high degree of impedance mismatch between the coaxial cable and the input of the low pass filter at frequencies above the cut-off frequency, there is a high VSWR on the feed cable between the transmitter and the filter at harmonic frequencies. Also, since there is usually no provision for external dissipation of this energy, and since harmonic energy is continually being produced, dissipation occurs only in the final amplifier stage and in the cable. Consequently there is a likelihood of harmonic energy radiation from the transmitter itself, as well as possible harmonic energy radiation from the cable because of leakage, faulty connectors and so forth

An obvious solution is to use a high-pass filter having a 50 ohm resistive load connected in shunt with the feed line, eg by means of a coaxial T connector. Such a high-pass filter should be designed to have the same cut-off frequency as the low-pass filter, to have a 50 ohm input and output impedance, and to have a series M-derived end sections so that its input impedance at frequencies below cut-off will be high

The result will be that harmonic energy is dissipated in the 50 ohm load connected to the output terminals of the high-pass filter. The shunt effect of the high-pass filter will be negligible at low frequencies because of the high input impedence of the filter below cut-off There will be no high currents and voltages at harmonic frequencies since the SWR at the harmonic frequencies will be close to unity. Harmonic energy will be dissipated outside of the transmitter chassis, and not all in the final amplifier, so the final stage will run cooler. Of course, all this can lead to less TVI. This concept of complimentary filters has been used for many years in hi-fi installations for separation of high and low frequencies

Interference problems quite often involve third parties and for this reason members of the Amateur Radio Service should, at all times, be very conscious of the social, legal and "political" implications of entering another person's property for the purpose of making adjustments, modifications, or just observing any form of interference problem or complaint.

The National EMC Advisory Service warns against any attempt to make adjustments or modifications to any other person's property or equipment unless you have a positive, preferably written, statement from this person, giving you full authority to make adjustments and/or modifications, etc. The agreement should clearly state that no responsibility for the said person's property or equipment shall rest on any member of the Amateur Radio Service

Throughout the year there has been many standard, as well as a number of strange EMC effects which have been brought to our attention . . . With the approach of summer the case of the "EMI pool" may be of interest — From NSW a VK2 amateur says, *"For some eighteen months I have been troubled with AC arcing type noise reaching S9 on peaks and covering the HF spectrum and above. Evident around 6-7 AM and late afternoon. A pulse of 4 secs duration every 42 secs. I traced*

the problem to a swimming pool automatic chlorinator about 250 yds from my station. The manufacturers replaced the offending unit with a later model solid-state unit."

From Victoria, a report on masthead amplifiers and associated installations. *"A well known TV antenna organisation recommends that a MHA not be mounted within the structure of phased array TV antennas. It seems that the amplifier may radiate sufficient signal from its plastic box to be picked-up by the antenna and re-amplified, thereby causing oscillation at 'whatever' frequency. Another problem appears to be the constant use of poor quality coaxial cable. Many of these cables, unlike communications quality, have loose open weave braid. Signal leakage from these type of cables can get back into the MHA input. This is more of a problem where distribution amplifiers are used with high gain and the input and output cables are in the same duct alongside each other. The very high gain of MHA's is not usually required unless a very long output lead is required and/or a number of splitters are needed. About 15-20 dB is more than adequate in most cases."*

Again from VK3 is a report on how to transmit computer data on your VHF phone signal. Set yourself up next to a big commercial computer and you could find that the AC supply is modulating your transmitter with information which you could well do without.

Finally, from VK . . . who was chasing a TVI problem, on and off, for months. Then, for unconnected reasons, VK . . . decided to give the shack a "bit of a once over". The clean-up revealed crossed antenna feed lines. It was a bit hard to decide how long the shack had been provided with high frequency heating. The moral is — identify your feed lines at both ends.

In conclusion, returning to the Radiocommunications Act, I would like to remind *all* Australian amateurs that the CASPAR (Communications Act Special Planning And Response) Committee will again be coordinating and correlating the Institute's response in connection with the Regulations and Standards relating to the new Act. One cannot emphasise too much the importance of good and fair regulations and standards. The Amateur Radio Service will be affected by these, so it is most important that we produce, as far as possible, a truly united effort in the presentation of our case material. The drafting of Standards and Regulations will be a most complex, technical and political operation, and in this respect the CASPAR Committee will need as much assistance as possible from *all* Australian amateurs in order to try to ensure that the Amateur Service procures the best possible deal.

Any material, suggestions, comments etc in relation to any aspect of the new Act should be sent to — The CASPAR Co-ordinator, PO Box 300, Caulfield South, Vic 3162.

Finally, my thanks to all those who have assisted with the EMC operation throughout the year . . . Best Wishes for Christmas and the New Year from VK3QQ.

AR

AWARDS

Mike Bazeley, VK6HD
FEDERAL AWARDS MANAGER
8 James Road, Kalamunda, WA 6076

Most of my time, whilst being Federal Awards Manager, seems to be taken up with DXCC matters. There is an obvious interest in this award and updating country totals. Checking through some of these country totals I have come across several errors. These errors, in the main, are caused by deletions not being taken off, or countries claimed which subsequently were not accepted for DXCC purposes. The present DXCC list contains 315 current countries and there is a deleted list of fifty one. The updated DXCC list can be found on pages 148 to 151 in the 1983/84 Australian Callbook. Those of you who are interested in the DXCC listings could you please check your scores against the current list and advise me of any errors, many thanks. Further copies of the DXCC list may be obtained from me — don't forget the SASE please.

Two possible additions to the DXCC lists may be KL7 Pribolof Islands and KH5 Jarvis. The rumourmongers are betting a fifty-fifty chance on the former and little chance on the latter. Hope all that needed them made HK0 Malpelo and BY on SSB.

PIONEER SHIRE CENTENARY AWARD

The address for claims for this award is Box 1065, Mackay, Qld 4740.

GOLD COAST AMATEUR RADIO SOCIETY

The new conditions for the two awards sponsored by the above Society are as follows:

THE GOLD COAST AWARD: requires five points. Two points for a club station VK4WIG or VK4VGC (one only to count) and one point for any club member. Applications to be sent to: The Awards Manager, PO Box 588, Southport, Qld 4215 and must show: Time, Date, Callsign, Name, Location, Frequency, Mode, and include $1.00 to cover postage.

100 REPEATER AWARD: requires one hundred contacts to be made through the Gold Coast Repeater VK4RGC (VHF or UHF). The same station must not be worked under seven days. Applications to be sent to: The Awards Manager, as above, and must show: Time, Date, Callsign, Name, Location, Frequency (VHF or UHF), and include $1.00 to cover postage.

To assist stations to obtain the Gold Coast Award the Society will be starting a new club net on 21.175 MHz + at 1500 UTC every Sunday afternoon commencing in November.

Well once again another year has gone by, may I take this opportunity to wish all a very Happy Xmas and happy DXing in 1984. 73 de Mike VK6HD. **AR**

EDUCATION NOTES

The statistics for the August exams were received recently. Readers will be pleased to know that the pass rates recovered somewhat from the very low rates in February this year. The range this time extends from 24.4% (VK6) to 48.8% (VK5) with an overall figure of 39.1% compared to the February figure of 20.9% overall.

Five separate papers were used, some of them a repeat of previous papers, and some with a certain amount of new material added. I have not yet seen the papers, so cannot cricitise, but I have not had much adverse comments from candidates.

Candidate numbers for this exam were very close to those for August 1982, but in all states except VK6 pass rates were higher this time —VKs 2 and 3 recorded their highest pass rates of the past three years.

However these top rates of 38.9% and 42.6% respectively are not as high as the top rate for the states with smaller numbers.

The pass rates for the 10 WPM CW exams however are, mostly, significantly lower than they were in February, or even August 1982.

Perhaps these results illustrate the variability that can occur. It is not likely that any particular Morse exam will be much harder than any other, but over the three years for which I have figures, 10 WPM pass rates by state have ranged from 26% to 85%, with the figures for VKs 2 and 3 varying from 26% to 51% and 35% to 43% respectively.

I have recently received a copy of the Instruction Kit prepared by the VK2 Division Education Service. It includes the new publication 'Novice Electronics' which together with the earlier booklet 'Into Electronics' provides a complete Theory course. This appears to provide a useful addition to the available material for students or instructors. It is simply written with clear diagrams and, in general, explanations that are easy to follow. These two books together with the '100 Basic Electronic Projects' from the same source would provide an interesting and effective course for schools looking for some application and extension of their electronic units.

The kit also includes a Morse code instruction book and tape. While I do not personally advocate the learning procedure recommended in the course, I can see the whole kit is a very useful package for the student trying to struggle through without benefit of classes or assistance.

To those of you who may want copies of CW exam tapes, please get them to me as early in December as possible, as my copying facilities tend to be unavailable over the school holidays. Sample exam papers are less difficult. I would like to thank all those who enclose return postage or contributions with their requests for tapes or papers.

Best wishes to you all for the forthcoming holiday season and the New Year. May the bands you want to use be open and your equipment free of problems.

73 *Brenda VK3KT* **AR**

CLUB CORNER

REDCLIFFE RADIO CLUB

The Redcliffe Radio Club's demonstration stand at the Caboolture Sunshine Festival attracted a great deal of interest. Andrew Hite of Caboolture and Steve Howarth of Redcliffe, (from left) looked over one of the many different pieces of equipment.

AR

AUSTRALIAN CWQRP CLUB

The VK CWQRP Club has been disbanded. There are moves to form a new CWQRP Club and anyone interested, including former members please contact:— Mr Len O'Donnel, VK5ZF, 33 Lucas Street, Richmond, SA 5033.

AR

VICTORIAN MIDLAND ZONE

The December meeting will be the Christmas breakup at the home of the president Don VK3XBL at Mandurang Sth on Friday 16th from 6 PM onwards. BYO barbecue or cold salads etc if weather not suitable for barbecue. All welcome.

The Annual Midland Zone Convention will be held on Sunday 19th February at the usual venue at Strathfieldsaye near Bendigo. Full details will appear in the February issue of AR but please note this date. Catering etc will be as 1983.

Margaret Loft, VK3DML
HONORARY SECRETARY

AR

ANARTS

This year, being World Communications Year, the Australian National Amateur Radio Teleprinter Society made a special effort with their Annual RTTY Contest. The VK/ZL WCY RTTY Contest, and studying the logs received, it would appear that their efforts were well rewarded and the results most encouraging. We were fortunate to have the backing of the International Telecommunications Union, and were elated when the Secretary General Mr R E Butler offered to donate the trophies for the winners of each section. It was later announced, Mr Butler would be attending the IREE Convention in Sydney, and was particularly anxious to actually present the trophies to the Australian winners, in person, while in Sydney. The committee of ANARTS organised a dinner at one of the leading hotels to meet and entertain Mr Butler, during which he presented trophies to the Australian Single Operator and Multi-Operator winners. He also presented trophies to representatives of the world single operator and world multi-operator winners. To remind Mr Butler of his meeting with ANARTS, he was presented with a book of Australian scenes.

Mr Butler presenting trophy to Bruce VK2RT.

Members present at the dinner. L to R Peter VK2ABH, Pierce VK2APQ and Mirek Joachim — technical consultant to ministry of communications in Czechoslavakia.

Mr Butler delivering his speech. Syd VK2SG, President ANARTS is to his left.

Following is a brief history of the ANARTS which was formed in 1976 by Bill VK2EG and Syd VK2SG to encourage the use of RTTY and to assist those interested in the mode setting up their gear. Also to further assist members, ANARTS produce kits for modulators (AFSK and FSK), demodulators and power supplies. They also purchased, in bulk lot, machines (Model 15s at the time) for the members, and assisted in getting them operational. To keep members informed on new equipment and the general doings in RTTY, a news letter called 'AREWISE' was produced, this news letter was sent to members every two months. A news broadcast in RTTY was also commenced at this time, using our official callsign VK2TTY. This broadcast is now transmitted every Sunday at 0030 UTC on 7.045, 14.090, 14.095 and 146.675 MHz. The 14.090 transmission is beamed north and the 14.095 transmission is beamed west. This broadcast is repeated at 0930 UTC on 3.545 and 146.675 MHz. These news broadcasts contain news of interest to the RTTY fraternity from all over the world, plus DX notes for CW, SSB and RTTY. We are one of the very few stations throughout the world who broadcast RTTY DX news, and as such have a big following. The broadcasts are regularly received throughout Australia and South Pacific Islands. Also, news contained in these broadcasts is regularly used during the week by stations in other states.

Syd Molen, VK2SG
PRESIDENT

AR

MOUNT ANAKIE REPEATER

The Geelong Amateur Radio Club, who has the responsibility for the operation and maintenance of the Mt Anakie Repeater VK3RGL, is presently conducting a fund raising effort due to the necessity to rebuild and relocate the Repeater to another site on Mt Anakie.

As a mark of our appreciation this club has produced a certificate, which will be sent to all amateurs and SWLs who assist us with a donation.

Barry Abley, VK3YXK
HONORARY SECRETARY

AR

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Details in January Amateur Radio.

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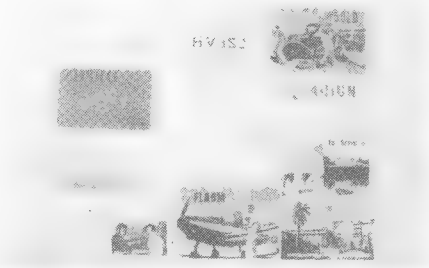

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VK2 MINI BULLETIN

Jeff Pages, VK2BYY
VK2 MINI BULLETIN EDITOR
PO Box 1066, Parramatta, NSW 2150

NOTICE OF MEETING

The Annual General Meeting of the Wireless Institute of Australia, New South Wales Division will be held at 2 PM on Saturday, 31st March, 1984.

Nominations for election to Council and agenda items for this meeting should be directed to The Secretary, PO Box 1066, Parramatta, NSW, 2150 and must reach the Divisional Office no later than Wednesday, 29th February, 1984. Nomination forms may be obtained from the office, either by calling, writing or phoning (02) 689 2417.

Any ordinary, ie full, member of the WIA NSW Division may stand for election to the Divisional Council. Would members please note that no business may be discussed or voted on at the AGM unless all members receive notice of such business (see Article 31). Please ensure that any motions you wish discussed reach the office by 29th February, 1984.

(sgd) David Walters, VK2AYO
HONORARY SECRETARY WIA NSW DIVISION

COUNCIL REPORT

Divisional Council met at Amateur Radio House on 14th October, 1983. Fourteen new applications for membership were accepted. Council resolved to adopt the recommendations of Federal Executive on the proposed Radio Communications Bill, and congratulate Michael Owen in particular for his efforts on our behalf.

Council received three nominations for the Dick Smith Educator of the Year Award. After a secret ballot amongst the councillors Keith Howard, VK2AKX was given the award, which was presented at last month's Conference of Clubs.

Council decided to nominate Dick Smith, VK2DIK for the Ron Wilkinson Achievement Award for his outstanding solo around the world flight using and promoting the Amateur Radio Service in the countries he flew over. This Federal Award is made in honour of the late Ron Wilkinson, VK3AKC and is given for special achievement in any facet of amateur radio by any amateur.

REPEATER INTERFERENCE

Last month's report on interference to the Dural repeater by a new Telecom paging transmitter has a sequel, and it's good news. Shortly after last month's column was written, Telecom advised that, following representations on our behalf by the Department of Communications, they had fitted filters to the paging transmitter. As a result the interference to the repeater has been completely eliminated. Council expresses its appreciation on behalf of all users of this service for the efforts made by the DOC and Telecom officers, particularly as the transmitter concerned was operating well within specifications and Telecom were under no legal obligation to install the filters.

DIVISIONAL OFFICE

Members are reminded that Bankcard is now accepted for personal, mail or phone purchases from the Divisional Office. If purchasing by mail or phone, please give your name, Bankcard number and address (not a post office box). Note that only payments to the Division may be made by Bankcard; this does NOT include membership renewal, which is paid directly to Federal.

The Divisional Office is open each week day between 11 AM and 2 PM, and in addition each Wednesday night between 7 PM and 9 PM and on the FIRST Saturday of the month between 11 AM and 2 PM. The Saturday openings are for a trial period to establish whether or not a demand exists for this service.

The Office stocks a wide range of publications of interest to the amateur. Send an SAE for a current price list. Membership badges, metal car badges, car stickers and blank QSL cards featuring the WIA emblem are also available to members.

The Office will be closed over the Christmas period, but at the time of writing the exact dates are not yet known. Listen to broadcasts for details.

On behalf of Council I wish all members and their families a happy and healthy Christmas and New Year.

73 from Jeff, VK2BYY

AR

FIVE-EIGHTH WAVE

Jennifer Warrington, VK5ANW
GPO, Box 1234, Adelaide, SA 5001

A few months ago I commented that we had heard 'rumblings of discontent' from VK8 and other sources. Well, although we are doing our best to solve any problems as they occur, and in general improve the lines of communication between divisional council and our far flung members, it did occur to us that perhaps now would be a good time to look at the possibilities of VK8 becoming an autonomous division. I made discreet enquiries to FE as to how one went about it, and Ken Westerman, VK5AGW, our Membership Secretary, made discreet inquiries of some of the members in Alice Springs and Darwin, whilst he was holidaying up there in September. The general impression he received was that they were in favour, however we realised that this was only a very small representation of the total number of VK8s so, on his return to VK5, a questionnaire was sent to *all* VK8s asking for their opinions.

At the time of writing we are awaiting the results of this, and it may be well into the new year before I can report on the results. It was made clear in the questionnaire that there was no guarantee of success even if the results were favourable. Although there are 187 licenced amateurs in VK8, only about 50 of these are WIA members. It may be that FE and the other divisions (all of whom must agree to the proposal) will consider that 50 members is not enough to form a division, and that they will have to recruit more members before it can be considered. At this stage there are a great number of hypothetical 'ifs and buts' and nothing will happen 'overnight'. In a lighter vein — there is of course the possibility that VK5 may loose the RD Trophy without the VK8s to help us!

Whilst Ken, VK5AGW was in VK8 he made the tourist pilgrimage to the top of Ayers Rock, complete with 2 metre hand-held. Unfortunately he didn't make any contacts, so he won't have to worry about having a special QSL card printed!

Once again we are advertising a 'Position Vacant'. This time it is for a new Intruder Watch Co-ordinator. Colin Ralph, VK5KCR, who took over the position some 18 months ago, has had to relinquish it due to personal commitments. We thank you, Colin, for your efforts, and hope that someone out there will also see the need to keep our bands free of pirates. If you would like to help please contact a council member as soon as possible.

DIARY DATES

Tuesday, 6th December: Christmas Social — Thebarton Assembly Rooms with guest speaker — Wally Watkins, VK2DEW, talking on China. Bring your partner and a plate of supper.

24th January: Check December's Journal and Broadcasts for details.

Membership Subscriptions for 1984 are now due.

Please pay promptly for continuation of your membership!

VK4 WIA NOTES

Bud Pounsett, VK4QY
Box 638, GPO, Brisbane, Qld 4001

These pictures were taken at the sixth North Queensland Radio Convention held at the James Cook University, Townsville 23rd-25th September, 1983.

WIAQ President, Guy, VK4ZXZ bringing best wishes for a successful sixth North Queensland Radio Convention.

Hidden transmitter hunt prize to John, VK4NIE/YLG, *"The Best Sniffer in North Queensland"*.

A small group of the crowd during the opening ceremony.

Bertha, XYL of Les, VK4LZ, receiving the floral art demonstration basket for 100% attendances at North Queensland Conventions.

Congratulations to Evelyn, VK4EQ, number 24 Merit Award, presented by Guy, VK4ZXZ, President of the Queensland Division.

Rogert, VK4CD, left, presenting prizes to fox hunt winners, Bill, VK4XZ and Terry, VK4ATY.

Seasons Greetings to all.

73, Bud VK4QY
AR

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publisher.

JUBILEE ISSUE

Your copy of the Golden Jubilee Issue 1933-1983 Amateur Radio was a real credit to the editor and the picture of the OM amateur radio operater just fitted the meaning of what the Golden Jubilee is all about. May I say keep up the good work you are doing a marvellous job Thanking you once again.

Yours faithfully,
H C Harmer
14 Scott Street
Sefton Park, 5083
AR

LETTER OF THANKS

At our last meeting, it was resolved that a special letter of thanks be sent to you expressing our praise for recent issues of Amateur Radio but, in particular for the Golden Jubilee Issue.

It must be difficult to maintain such high standard but you and your team managed to give it that extra lift — a suitable celebration of fifty years of service to AR!

Best 73 es GD!
Charles Ivin, VK4BPI
Secretary
Mackay Amateur Radio Club
PO Box 1065
Mackay, 4740
AR

ANTARCTIC STATION

I have been selected as a member of the 1984 Antarctic Research Expedition to Mawson station. I have just been granted a licence to operate amateur gear at the base (VK0GL) and would like to advise other amateurs that I will be striving to make *many* contacts in the period January '84 - February '85.

Here in Australia I am known as VK3YTU and have never operated HF before I am very excited about the potential for developing my skill and techniques as an amateur, not to mention the joy of being able to speak with my fellow Australians back home.

I am an Electronic Engineer and will be making a detailed study of the ionosphere with the aid of devices such as an ionosonde, riometers, magnetometers etc.

Finally, congratulations on an excellent magazine.

Yours faithfully,
Grant W Lamont, VK3YTU (soon to be VK0GL)
Ionospheric Prediction Service
PO Box 702
Darlinghurst, NSW 2010
AR

BOUQUETS

Bouquets to Tom Laidler, VK5TL and Marshall Emm, VK5FN for their helpful hints on how to send and receive CW!

More power to them!

73,
Les Cullen, VK2WU
PO Box 31
Winmalee, NSW 2777
AR

NOVICE OPERATORS

I request everyone to re-read the article written by Rex Black, VK2YA on p 75 of October issue of Amateur Radio, where he submits a few quite valid grounds for the CW novices to be given a portion of the 7 MHz band. They could be distinguished by a / C after their callsigns.

Enough havoc has been caused in the offices of the DOC, the VK and Foreign Call Books with amateurs upgrading from novice to K to full call in a matter of six months or so.

This letter is to refresh the memories of the WIA council members who held office for the year 1980/81. I sent a letter to each divisional council containing many extracts from my (VK5NLC) Novice Notes that had been written in the VK5 Journals. It stressed the need for the skilled Novice CW operators being allowed to operate down to 21 and 28 MHz.

With the proposed extension of the 80 metre band, I request the Novice Allocation be extended up to 3.7 MHz (WARC-use the bands or lose them). With so many novices in VK2 and VK5 (myself included) doing slow Morse sessions, I suggest its frequency could also be moved up near the top end of the band, thereby easing local QRM to many stations trying to operate in the same locality, Port Lincoln for example

Now in 1983 we find that the Third Party Net requires a given and clear frequency as many operators found we were giving it QRM during the recent RD Contest. If novices could go up to 3.7 MHz this contest would be more enjoyable also.

Once again, I strongly recommend that the next Federal Convention give some serious consideration about my proposals, there being NO necessity for any changes to existing novice callsigns etc.

With the use of my CW programmable CQ caller that will be described in this magazine soon, a novice can put out CQ calls on 10 and 15 metres, even when the bands seem dead. By continual use of CW the unskilled Novice Operator would increase his speed up to 10 WPM and bypass the K call.

On page 26, AR July 1983, in "Representation to the DOC" I quote, "Possible use of Morse on VHF by K licencees" unquote. Surely my request would help to cancel out the above quote, also the claim that novices were not expected to upgrade to full call has been proved as false.

Yours faithfully
Lindsay Collins, VK5GZ
12 Park Avenue
Rosslyn Park, 5072
AR

EDITOR'S NOTE:

Matters requiring attention at the Federal Convention should be raised with your division. The division, after consideration may then submit an agenda item for the Federal Convention.

APPRECIATION

I wish to show my appreciation to all concerned in the "Golden Jubilee Issue 1933-83", which in my opinion was an excellent job in all aspects, the old timers photos of past days, very good indeed.

I enjoyed the article on VK2ZI, also Gavin VK3YK and VK3RV, but the article on VK3BQ by VK3ZS was a masterpiece of research and writing, so once again as one person in VK2, I thank all concerned.

Cheerio,
M E Austin, VK2KZ
6 Stanford Street
Kurri Kurri, 2327
AR

TAKE A BOW SLOW MORSE OPERATORS

Re your very excellent nightly slow Morse practice broadcasts on 80 metres, I would like to convey my sincere thanks to those tireless operators who must have unlimited patience. It was largely through these broadcasts that I was able to obtain my novice licence.

If I may, I would like to make a suggestion, which may or may not have been tried before. This being that a simple means of self correction of random type received would be to send simple text backwards. Eg: EDOC ESROM WOLS.

73,
James Armytage, VK2PNM
Kelburn
Gilgandra, 2827
AR

ZONAL AWARDS

I agree with John Andersen, VK5ZFO, in the August issue, that the tragic Spratly Islands affair should cause us to reconsider the DXCC so-called countries list. No doubt in earlier days, the DXCC certificate was a genuine proof of one's dedication and operating skills, but in the 1980s, anyone can work a hundred countries over a major contest weekend. So what is the DXCC now worth? The difficulty in working *all* the countries on the list now is a political rather than a technical one, as illustrated by the Burma situation.

Mr Andersen's suggestion to divide the world into areas by latitude and longitude, ignoring the countries concept, is a sound one since it does away with the nonsense of places like the St Peter and Paul Rocks being classed as a country. However, such a worldwide grid system already exists and is in use by the Moonbounce fraternity. It is called the "Maidenhead Locator System" since it evolved in discussions between Region 1 VHF operators in the English town of Maidenhead on 26th and 27th April, 1980.

In this system, the globe is divided into 324 "fields", each 20° from east to west and 10° from north to south, identified by two letters from AA through RR, the origins being latitude 90° south and 180° east. The "numbering" is always from south to north and west to east. (By the way, VK5ZFO's 20° x 20° grid would only give 162 areas.)

For VHF use, the main fields are further subdivided the end result being a locator such as IO 93 WH for my location. Obviously any award based upon this idea would only use the first two letters. So, instead of VK1 through eight only counting as one country, there would be ten fields to work. For example, Victoria is in QF and the Darwin region of NT is PH. There are already two zonal systems — the CQ Magazine one with forty and ITU one with ninety, so it is a moot point whether anyone would wish to sponsor such a new award. However, the Moonbounce folk, in their Lunar Letter Magazine, seem to be keen on listing the fields worked by contributors.

Yours sincerely,
Norman Fitch, G3FPK
Editor
"VHF Bands" Short Wave Magazine
40 Eskdale Gardens
Purley
Surrey, England. GR2 IEZ
AR

IN REPLY TO 'WHO AM I'. OCTOBER 83, AR.

Firstly may I congratulate you on the interest you show in your son's hobby. I bet there are many other 'sons' around that wish they had a mother like you.

Now for your problem.

Out of the thousands of people that your son can

talk to around the world, you are the only one that he can call Mother. So, instead of using OL which I am sure you're not, may I suggest that you tell them all that you are very proudly "My Son's MUM!!!"

Keep up the good work Madame.

Yours sincerely,
John Clark, VK2AUZ
PO Box 198
Engadine, 2233

AR

BEREAVEMENT

9M2LN Nara . . . passed away 21st July, 1983 in Kuala Lumpur, Malaysia.

I have been requested by Nara's widow Kuttyma, and family, to pass on their sincere thanks and gratitude to the many Australian and overseas radio amateurs, for their letters, cards, and messages of sympathy, following the sad loss of a fine husband, father, grandfather, and dedicated radio amateur.

It is impossible to thank everyone individually, so please accept this as their personal message to each and everyone for their kind thoughts.

Nara will be sadly missed, but remembered always but all who knew him.

Arthur Pritchard, VK3DPA
45 McCulloch Street, Nunawading 3131
For Kuttyma Narayana and family,
Kuala Lumpur, Malaysia

AR

VISIT TO UJUNG PANDANG

Recently I visited the city of Ujung Pandang in South Sulawesi, YB8. This visit was arranged by John YB8AX and myself as a contribution to WCY activities.

The cities of Lismore, NSW and Ujung Pandang have a twin city agreement and my XYL and myself were the first private visitors since the signing of the agreement. John took the opportunity of this visit to promote WCY and amateur radio to the authorities in South Sulawesi.

Two informal evenings were arranged during which I met about 100 amateurs and was able to tell them about amateur radio in VK land. I was surprised to learn that they were riding the crest of the CB boom and had recruited about 600 students into classes for amateur licences. It is anticipated their amateur population will be approximately 400 by the year 1985.

I believe my visit under the banner of WCY had the following effect:

- *The authorities of South Sulawesi became aware of what WCY was about and support the concept.*
- *They also became very much aware of ORARI (similar to WIA but not a member of the IARU).*
- *Through the concept of WCY the twin cities agreement was considerably enhanced as many of the communications problems were overcome during the visit.*

The Indonesian amateurs were very easy to communicate with and are very courteous and hospitable.

The photograph shows myself with a group of Ujung Pandang amateurs. John YB8AX is third from the left.

73,
Gordon Dowse, VK2AGE
Lot 2 Bruxner Highway
Goonellabah, 2480

AR

QSP

SATELLITE EARTH STATION TESTING TO BEGIN SOON AT INNISFAIL

Earth stations are currently being installed at Innisfail, on the northern coast of Queensland, as part of a test programme to determine which equipment is best suited for receiving signals from Australia's domestic communications satellites which are to be launched in the second half of 1985.

The Minister for Communications, Mr Michael Duffy, said that thirty eight earth stations, ranging in diameter from 0.9 metres to 2.4 metres would be tested at the Joint Tropical Trials Establishment.

A 30-metre mast with a transmitter on the top would be used to simulate signals from a satellite.

The earth stations would be linked to a specially built caravan containing monitoring equipment. Results of tests would be fed automatically into a master computer at the Department of Communications' Canberra headquarters for processing and comparison.

"Results will be used to help decide technical specifications of the earth stations that individual householders will need to buy in order to receive the Homestead and Community Broadcasting Satellite Service (HACBSS)," Mr Duffy said.

"This service will enable all Australians to receive one ABC television service and at least two ABC radio services via the domestic satellites."

Earth stations were also being tested at Port Hedland and Alice Springs to ensure they were subjected to the most extreme weather conditions — high rainfall, cyclonic winds, dust and wide fluctuations in temperatures.

Mr Duffy said DOC engineers would study the performance of the test earth stations under these conditions to determine how they would stand up to harsh weather once the satellite system began operating. Most householders and communities who would invest in earth stations lived in conditions of extreme climatic change, so the 'dishes' had to be particularly resilient.

The smallest of the earth stations was expected to sell for around $1000 and should be easy to transport, install and maintain on a 'handyman' basis, Mr Duffy said.

"Trials such as the one to be conducted at Innisfail are essential so that when mass production of earth stations begins manufacturers will have proper system standards to follow.

"This is doubly important because Australia is breaking new ground with the HACBSS project — twelve GHz earth stations have never been used for large-scale television and radio reception in climatic conditions as varied and extreme as Australia's."

AR

MULTICULTURAL TELEVISION SERVICE TO TRANSMIT ON UHF ONLY

The Multicultural Television Service, currently transmitted in Sydney and Melbourne on both VHF on Channel 0 and UHF Channel 28, would only be shown on UHF Channel 28 from 1st January, 1985, the Minister for Communications, Mr Michael Duffy, announced on 31st August, 1983.

Mr Duffy said the announcement was being made at such an early date to ensure that all viewers of multicultural television could familiarise themselves with Ultra High Frequency (UHF) reception and equipment by the time Channel 0 was phased out.

"*When the decision was taken to establish the Multicultural Television Service few people in Sydney and Melbourne had UHF receivers and antennas,*" the Minister said. "*That situation is changing quite rapidly and today most receivers produced have both VHF and UHF capability.*

"*It was always intended that transmissions on VHF Channel 0 would be an interim step to allow people to receive it first on VHF and have time to learn about reception of Ultra High Frequency signals.*

"*As it is proposed that prospective new developments — such as supplementary licences, RSTV services and public television — could be established on UHF, the Government considers it is time that existing and new multicultural television services should be transmitted solely on UHF.*"

Mr Duffy said that Channel 28 transmissions currently covered 96% of the population in the Melbourne metropolitan television area Recently completed work on the UHF aerial on the Gore Hill tower in Sydney would ensure coverage similar to that of the other television channels in that city

Extension of multicultural television to Canberra, Goulburn and Cooma in September/October this year, and to other metropolitan centres over the next few years, would be solely in the UHF band.

"*The phasing out of Channel 0 is part of the Government's policy to ensure the orderly development of use of the radio frequency spectrum,*" Mr Duffy said.

"*The VHF band is becoming crowded as new FM radio stations join the increasing number of television stations using this band. The result can be poor reception as one station interferes with another.*

"*On the other hand, the UHF band is less crowded and can accommodate more television services.*"

Mr Duffy said UHF television provided extremely high quality reception, but viewers would have to ensure they had the correct receiving equipment. It was necessary for all sets to be connected to a special outdoor UHF antenna via a low-loss UHF cable.

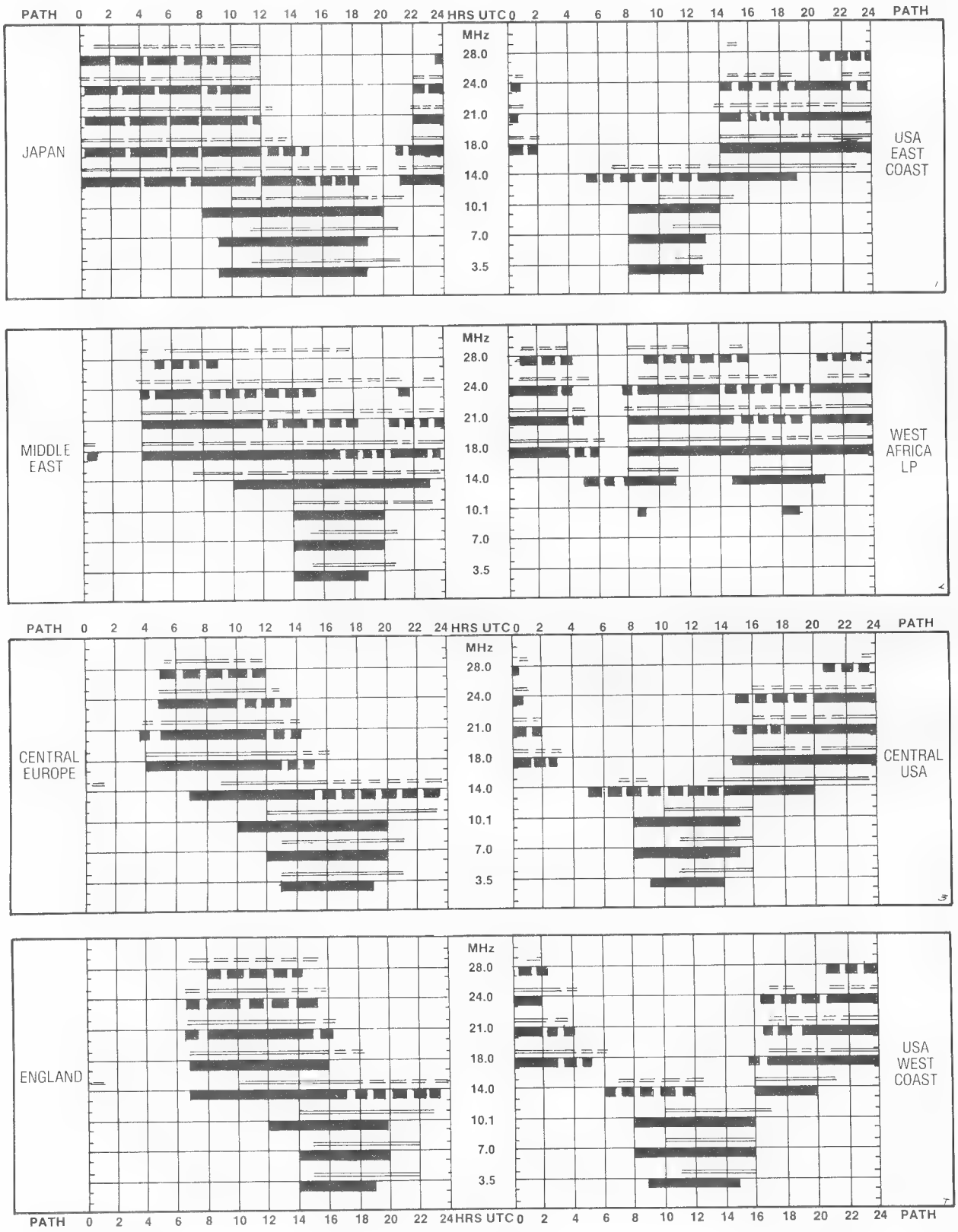
Most modern television sets were equipped to receive UHF channels. Older VHF-only sets would require a small UHF/VHF down-converter to allow UHF reception.

The Minister said: "*Most households with the appropriate equipment will have no difficulty in receiving the UHF signals. The quality of both the picture and sound will be as good as that offered by stations in the VHF band.*"

AR

IONOSPHERIC PREDICTIONS

Len Poynter VK3BYE

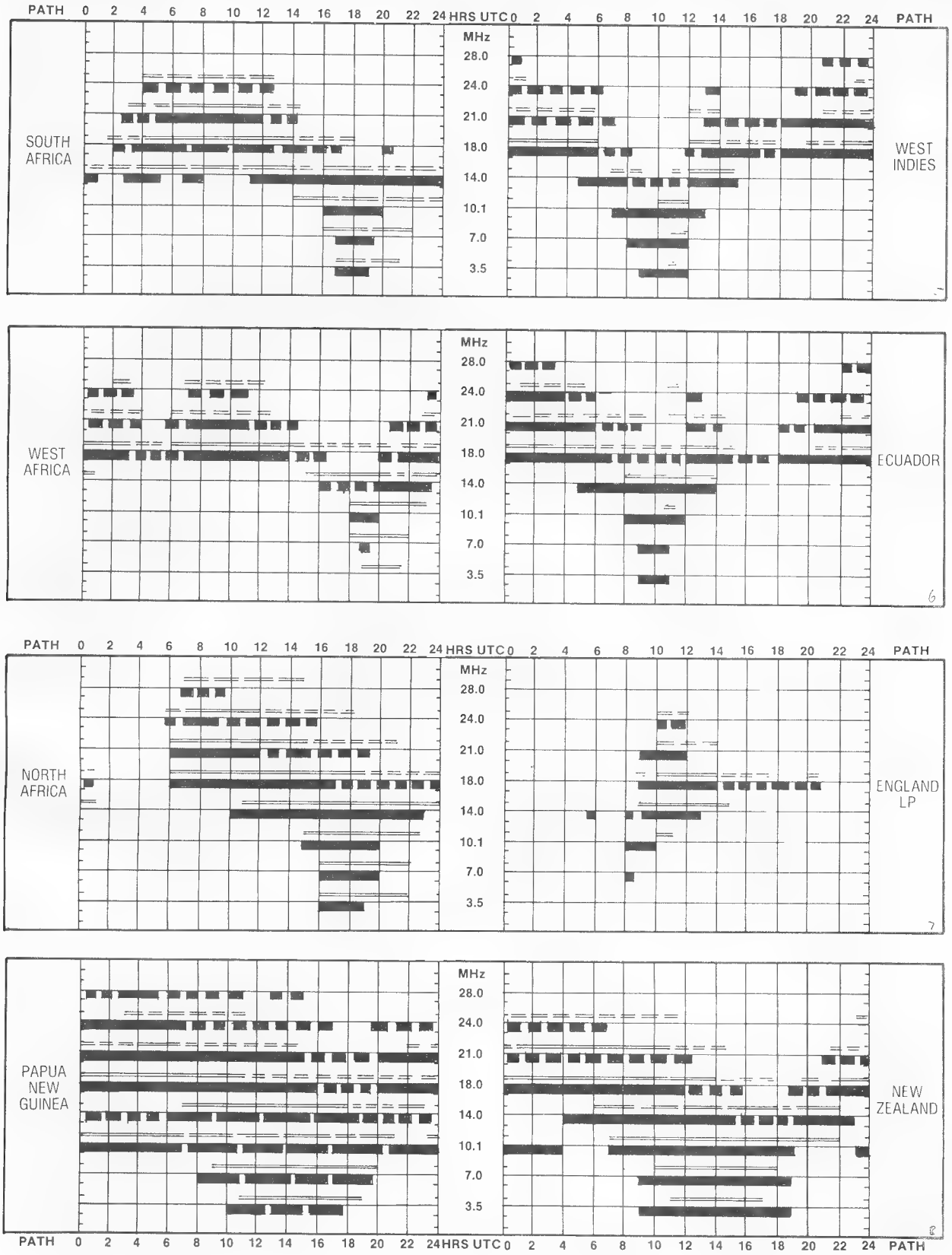


LEGEND

From West Australia

From East Australia

Better than 50% of the month, but not every day



Predictions courtesy Department of Science and Environment IPS Sydney. All times in UTC.

Less than 50% of the month

PATHS — Unless otherwise indicated (ie LP = Long Path) all paths are Short Path.

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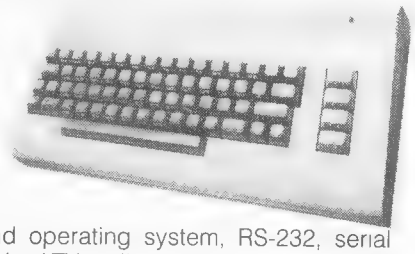

Both computers feature 20K BASIC and operating system, RS-232, serial IEEE-488 and parallel ports, video to standard TV or direct to monitor – disk and tape drives, printers, modems, light pens, etc. available plus hundreds of programmes for home and business – games, utilities, word processors, databases, home finance, education.

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Silent Keys

It is with deep regret we record the passing of —

MR CECIL KEITH BLANCH VK2GI

Obituaries

DICK BATY VK5MD

Dick Baty, VK5MD became a silent key on 16th September, 1983, he was 70 years old. Born in 1913, he obtained his licence in 1931 with the callsign VK5MH. He had joined the Naval Reserve, and at the outbreak of war had to regretfully decline a position with the then School of Mines (now the Institute of Technology) as a Radio Instructor, as he was called into the Navy as a Warrant Telegraphist.

At the end of the war (1946) he left the Navy with the rank of Commissioned Telegraphist and joined the Commercial Broadcasting station 5RM. In 1949 he joined Philips Electrical Industries where he remained until his retirement.

Around 1965 he again found time to become involved with amateur radio and unable to regain his old callsign, took the nearest available which was VK5MD. A keen CW operator, Dick was active on the bands until only a few months before his death, despite an illness which for many years had left him a semi-invalid.

A member of the WIA and RNARS, possibly Dick's best known achievement was the winning of the 1934 Fisk Trophy for a six stage relay between states. (See '5/8 Wave' for September and November, 1982, also p 8 AR 1.2.35.) Dick presented the trophy to the division in July, 1982 and it is on display in the BGB.

Although Dick's passing has taken from us a well liked and respected member of the fraternity, we would not have wished his continued suffering and can only be grateful that he sleeps peacefully at last.

Our sympathies are extended to his wife Bette and sons Ian and Ashley.

Jack Coulter, VK5JK
Jenny Warrington, VK5ANW

JOHN GRAYDON VK2AIS

John's amateur operations began on 7th February, 1938 with a QSO on 80 metres with VK2AHC. Operating on HF and VHF, John pursued his interest in amateur radio up to the day of his untimely death on 10th July of this year.

Most of John's working life was spent in the field of radio communications. A member of the permanent RAAF at the outbreak of war, he served through the war in many locations at home and abroad. He attained the rank of Flight Lieutenant in the Signals Branch.

In the post war years John joined the PMG Engineering Branch and later the ABC. He worked on the technical side of radio and television in the Sydney area. He retired from the ABC some few years ago.

To John's wife Gladys we extend our sincere sympathy.

Keith VK2EKH (originally VK2TQ)

CHARLES HEDLEY VK2MT
1908-1983

It is with deep regret we record the passing of Charles Hedley, VK2MT.

Charles was first licenced in January 1933 and maintained an active interest in amateur radio for half a century.

A CW enthusiast, Charles participated in the pioneering days of Australian radio communications.

Charles retired in 1973 from John Lysaght (Aust) Ltd at Port Kembla where he was employed as a Planning and Scheduling Engineer following a career which began at the Lysaght Newcastle plant in 1929.

Since the death of his wife several years ago, Charles, a quiet unassuming man, found comfort and companionship through his church and through the amateur fraternity.

An extensive traveller in his latter years, Charles had visited and befriended amateurs in Hawaii, USA and Canada.

To his daughter, granddaughter and son-in-law we share our feelings of sympathy.

Barry Hartley, VK2FE

RON W HOLLAND VK4AQ

Ron, VK4AQ, passed away on 30th September this year. Ron was born on 8th June, 1914, and due to the war, he had to wait until it finished before he could go on the air. He obtained his "ticket" in September 1939. He suffered considerably, during the latter part of his life.

He was a dedicated experimenter, and in his quiet way, was respected by all who knew him.

Our condolences to his wife and family.

VK4UX

MRS GENE TREBILCOCK

Victorian members will be saddened to learn of the passing of Gene Trebilcock. Gene and her OM Eric operated the Victorian Inwards QSL Bureau for many years.

Deepest sympathy is extended to Eric and family.

DEADLINE

All copy for February AR must arrive at PO Box 300, Caulfield South, Vic 3162 at the latest by the 3rd January, 1983.

HAMADS

PLEASE NOTE: *If you are advertising items FOR SALE and WANTED please write on separate sheets, including ALL details, eg Name, Address, on both. Please write copy for your Hamad as clearly as possible, preferably typed.*

*** Please insert STD code with phone numbers when you advertise.**

- Eight lines free to all WIA members. $9 per 10 words minimum for non-members.
- Copy in typescript please or in block letters double spaced to PO Box 300, Caulfield South 3162.
- Repeats may be charged at full rates.
- QTHR means address is correct as set out in the WIA current Call Book.

Ordinary Hamads submitted from members who are deemed to be in the general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being resold for merchandising purposes.

TRADE HAMADS

Conditions for commercial advertising are as follows: The rate is $15 for four lines, plus $2 per line (or part thereof) minimum charge $15 pre-payable. Copy is required by the deadline as stated below indexes on page 1.

AMIDON FERROMAGNETIC CORES: Large range for all receiver and transmitter applications. For data and price list send 105 x 220 SASE TO: RJ & US IMPORTS, Box 157, Mortdale, NSW 2223. (No enquiries at office: 11 Macken Street, Oakley, 2223).

CB RADIOS $69: Walkie talkies, short wave radios, military, outback, business, amateur, marine, repairs, RTTY Siemens 100 A printer $120; base mic $45; ultrasonic alarm $35; all ham bands on a single 6 ft whip, 1.8 to 30 MHz, for base or mobile $300; aerials, installation, demonstrations. 40 Ch CB conversions, accessories, new rigs weekly. BRIDGE DISPOSALS, 12 Old Town Plaza, opp Bankstown Railway Station, NSW. Mail order service and all enquiries to 2 Griffith Avenue, Roseville, 2069, or phone Sam VK2BVS, 7 pm to 9 pm only on (02) 407 1066.

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TELEREADER or similar CW monitor. Dave VK1GD, QTHR. Phone: (062) 54 1798.

WANTED — NSW

ATLAS 215 HF TRANSCEIVER, Paul VK2ATR, QTHR. Phone: (049) 59 3748.

WANTED — VIC

BROADCAST CARTRIDGE MACHINES. Any condition. Advise price and details to G Scott, 11 Balmoral Crs, Surrey Hills, 3127. Phone: (03) 890 4645.

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WANTED — QLD

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KINGSLEY AR7 RECEIVER. Coil boxes band "E" and band "D". Will pay reasonable price. Write John VK4NZ, QTHR. Phone: (071) 46 1458.

WANTED — SA

SOCKET AND CHIMNEY for 4CX250B. Details to VK5KUG, Box 1337, Stirling North, 5710. Phone: (086) 43 6455.

WANTED — WA

VFO 30G for Kenwood TR-7200G. Art VK6MX. Phone: (099) 23 1808.

FOR SALE — ACT

TRAPPED VERTICAL, V5JR in VGC. 2 full ¼ wave earth radial sets. 8 m RG58 coax, barge board mount and original packing and instructions. $115. VK1NET, QTHR. Phone: (062) 54 7960 AH.

FOR SALE — NSW

COMPLETE STATION. FT200, FP200, FC903. Clipsal key, 2 mics, earphones, dummy load, digi clock, log, 4 way mains sockets. See it in action at 321 Rouse St, Tenterfield. $500. VK2EES, QTHR. Phone: (067) 36 1394 BH.

DECEASED ESTATE of John VK2AIS late of Killara NSW. Kenwood TS820S and remote VFO $700. Kenwood TS520 and remote VFO $490. Kenwood antenna tuner AT200 $130. Tcvr IC-202 $150. All with h'books. Other gear incl pre-selector, tcvrs, recorder etc. What offers? Enquiries to (02) 46 3159 or VK2EKH (047) 57 1927.

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ICOM IC701, PS701, mic, RM3 controller, all $780. Icom IC211, $450. Icom IC511 with all optional boards, microwave modules linear, yagi and vert antennas $620. Icom IC245 $210. AR240 h'held, case charger $200. Tram XL5 modified on 10 m $80. Macrotronics RTTY interface, software for Apple, MDK17 modem, all cost over $500, sell $300. Roger VK2DNX, QTHR. Phone: (02) 546 1927.

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KENWOOD TS820S with remote VFO, DC, power supply and MC50 mic. Ex cond $600 ONO. Greg VK2KEO. Phone: (02) 982 3827 AH.

KYOKUTO FM144-10SXRII 2 m FM 10 W tcvr with mic, mobile mount and DC cables $150. Also RAAF sig gen $20. RAAF UHF wavemeter $20. VK2BQN, QTHR. Phone: (02) 451 6092.

RCA AR88D rx with 3 kHz mech filter, 100 kHz marker and instr man. $175 ONO. Prop pitch motor (brake removed) $100 ONO. Heathkit GDO 2-260 MHz $35. Xformer P240V, S1875/1875V 500 mA $50. Xformer P240V S 115V 2000VA $50. Collins 75A3 rx with 800 Hz; 3 kHz and 6 kHz mech filters. Inst man $250 ONO. Art VK2AS, QTHR. Phone: (02) 467 1784.

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TRANSCEIVER TS 520 with 500 Hz CW filter $395. VFO520 ext VFO $125. TV506 6 m transverter $125 or $600 the lot. All ex cond with owners manuals and orig pack. IC22S in good order with owners manual and orig pack $175. VK2WE, QTHR. Phone: (02) 487 1273.

YAESU FT7 HF Mobile tcvr in ex cond with 10 m fitted. $375 ONO. Yaesu FRG7 comm rx in ex cond $280 ONO. Offers to VK2POT, 27 Elizabeth St, Mayfield, 2304.

FOR SALE — VIC

COLLINS S-LINE 32S1, 75S1, 516F2. Collins noise blanker and DX speech processor incl. Linear amp, Heath SB200, perf cond. $350 firm. Rotator, Ham 2 with 240 V control $200. KW E-ZEE match $50. Bob VK3SK. Phone: (03) 527 1861.

IC22A 2 m tcvr together with digi scanning VFO and interconnections. Also 240 V power supply. $200 the lot. Roy VK3AOH, QTHR. Phone: (03) 49 6224.

ICOM 45A UHF, FM tcvr. Unmarked box. Incl snapin bracket. $370. VK3BSM, QTHR. Phone: (051) 27 4229 AH.

SX-200 SCANNING RECEIVER. Covers 26 MHz to 514 MHz, FM and AM. 13.8 VDC power, service manual incl $450. Power supply is avail if req'd $30. Steve. Phone: (03) 573 2266 BH.

YAESU FT-7 HF tcvr in ex cond $375. Kenwood TV502 2 m transverter (suit TS520 or 820) ex cond $150. Both items compl with cables, H'books etc. Laurie VK3KLF. Phone: (03) 417 5908 BH or (03) 337 3249 AH.

YAESU FT-2FB. VHF FM tcvr and FP-2 DC supply in good cond. Kenwood TS-520 HF tcvr. Needs alignment and VFO-520 remote VFO and SP-520 spkr. All with manuals. All available for reasonable offer. Melbourne sale only. Buyer to collect. Roy VK3XY, QTHR. Phone: (03) 557 1265.

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KENWOOD TS520S HF tcvr fitted with CW filter $550. Kenwood TS130S HF all band tcvr complete with Kenwood P/S30 (power supply) $700. Daiwa ant coupler, model CNW217 $100. Equipment perfect cond., no mods. Bert VK5AUS. Phone: (08) 44 5011.

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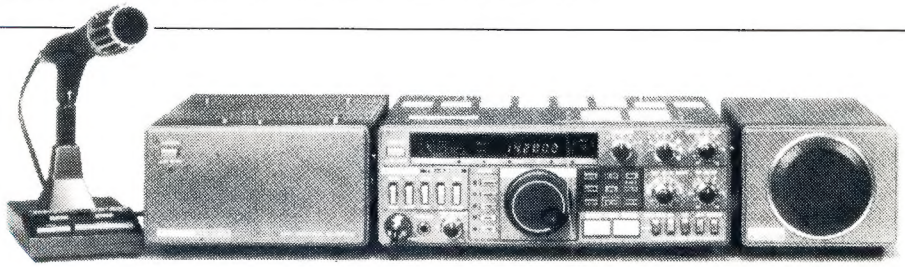

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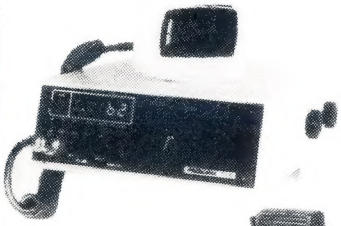

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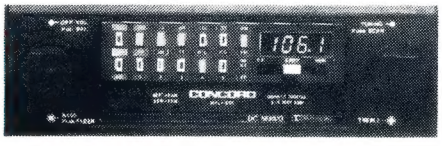

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